

**Association of Negative Affect and Emotional Intelligence with Depression
among Uninjured Children and Children Post-Traumatic Brain Injury:
Applicability of Resilience Models**

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Abstract

Resilience research provides theoretical and practical applications to the study of child psychopathology. The variable-focused approach investigates characteristics of individuals, environments and experiences to understand features associated with good outcomes. Three central constructs to this area are risk factors, associated with poorer outcomes; protective factors, associated with good outcomes and the outcome factor itself. Four models of resilience have been proposed to explore these relationships: the compensatory, risk-protective, challenge and protective-protective models.

Childhood depression is associated with emotional and social deficits and identification of risk and protective factors can inform treatment and prevention. Negative affect is a stable characteristic of emotional distress and is a potential risk factor for depression. In contrast, emotional intelligence is a potential protective factor. To date there is no published research investigating these factors utilising resilience models.

The aim of the present research was to investigate the applicability of the four models of resilience on depression in non-injured children and in a sample of children post mild traumatic brain injury (TBI). There is a growing literature indicating that children post-TBI are at an increased risk for depression. An exploratory study also investigated the resilience models in the prediction of depression in children post-TBI utilising parent reports.

Study 1 consisted of 82 children aged 8 – 11 years. Correlations indicated negative affect is a risk factor for depression, while emotional clarity and mood repair are protective factors. Support was found for the compensatory and challenge models with partial support for the risk-protective and protective-protective models.

Study 2 comprised of 32 children who had sustained a mild TBI 3 – 33 months previously. Negative affect correlated with depression as a risk factor while emotional clarity and mood repair were protective factors. Support was found for the compensatory and risk-protective models with partial support for the challenge and protective-protective models.

Study 3 utilised parent reports of the Study 2 children, examining the prediction of depression in children from lability/negativity and emotion regulation. Lability/negativity correlated with depression as a risk factor, while emotion regulation was a protective factor. No support was found for the compensatory, risk-protective or challenge models with partial support for the protective-protective model.

Overall, the results indicated negative affect is a risk factor for depression, while emotional intelligence is a protective factor. In non-injured children and children post mild TBI the greatest support was found for the compensatory model.

Chapter 1

Overview of the Thesis

Within the context of stress or adversity many children develop negative outcomes such as academic, behavioural, developmental or psychological problems (Luthar & Zigler, 1991; Masten & Coatsworth, 1998). Emerging from investigators studying high risk factors in children, it has been found that some children who experience these risks do not go on to develop difficulties and may even flourish (Fergusson & Horwood, 2003; Garmezy, 1971; Murphy & Moriarty, 1976; Werner & Smith, 1982). The term resilience refers to an individual's adaptive ability to overcome risk factors and thrive (Masten & Coatsworth 1998; Masten & Gewirtz, 2006; Masten & Reed, 2002).

Research on resilience in children aims to identify risk factors, protective factors, and outcomes and to understand these relationships (Luthar & Zigler, 1991). A risk factor is defined as a threat to the individual's development which is associated with, or predicts, a negative outcome (Masten & Gewirtz, 2006; Masten & Reed, 2002). A protective factor is defined as an attribute of the individual or their environment which is associated with, or predicts positive outcomes within the context of risk (Masten & Gewirtz, 2006). Outcome factors are attributes of the individual which provide a measure of how well their life is going; this includes measures of development, academic achievement or of psychopathology. Developing our understanding of these factors can help inform ways to reduce the impact of risk factors and to promote resilience in children.

The following Chapter (Chapter 2) explores the construct of resilience and the definitions of central terms, and describes the four models of resilience used in research. It also provides an overview of identified risk factors for psychopathology

in children such as maltreatment (Cicchetti, Rogosch, Lynch, & Holt, 1993).

Intellectual functioning (Garmezy, Masten, & Tellegen, 1984) and parenting quality (Masten, 1994) are discussed as identified protective factors for childhood psychopathology.

Chapter 3 provides a discussion of childhood depression and resilience. Research identifying such risk factors for childhood depression as cognitive style (Lau, Rijdsdijk, Gregory, McGuffin, & Eley, 2007) and genetics (Shannon, Beauchaine, Brenner, Neuhaus, & Gatzke-Kopp, 2007) are summarised. An overview of identified protective factors for childhood depression is also provided, highlighting research into child temperament (Shannon et al., 2007) and family relationships (Carbonell et al., 2002).

TBI is introduced and defined in Chapter 4. Prevalence and incident rates of TBI in children are examined and the difficulties determining the true extent of mild TBI's are discussed. An overview of TBI severity and the use of depth and length of loss of consciousness (LOC) and duration of posttraumatic amnesia (PTA) to determine this are provided. Research investigating the incidence of psychopathology following TBI in adults is summarised, which suggests that adults post-TBI are at an increased risk for depression (Rapoport, 2012). In relation to children, studies examining the increased risk of psychiatric outcomes, in particular depression post-TBI is reviewed with findings indicating that children and adolescents are also at an increased risk for depression symptoms (Kirkwood et al., 2000; Luis & Mittenberg, 2002).

Chapter 5 provides a review of the research related to negative affect as a risk factor for depression and emotional intelligence as a protective factor for depression in children and the application of the four models of resilience. Therefore, this

literature review aims to explore the current research regarding risk and protective factors associated with depression in children. The review also aims to explore the research in relation to depression following TBI in children.

The primary focus of the current thesis was to examine the applicability of the four models of resilience in the prediction of depression in children. Chapters 6 to 8 present details and results from the three separate studies. Study 1 is detailed in Chapter 6 and examines the four models of resilience in the prediction of depression from negative affect (risk factor) and emotional intelligence (protective factor) in uninjured children. Study 2 (detailed in Chapter 7) also explores the applicability of the four models of resilience in depression in a clinical population of children post mild TBI. Lastly, Study 3 as presented in Chapter 8, is an exploratory study investigating the four models of resilience in the prediction of depression from lability/negativity (risk factor) and emotion regulation (protective factor) in children post mild TBI utilising parent reports. Finally Chapter 9 provides a general discussion of the findings of the present thesis. It provides an overview of the main results and relates these back to previous research and makes suggestions for future research directions.

Chapter 2

Introduction to Resilience in Children

The field of resilience in children has become increasingly important within developmental psychopathology (Luthar, 2006). Resilience research is expanding the knowledge of risk and protective factors, with this understanding being useful both theoretically and in its application (Calkins, Blandon, Williford, & Keane, 2007; Luthar, 2006). The present chapter provides an introduction to the concepts involved and a brief summary of the research on resilience in children.

2.1 Definition of Resilience

Investigators have proposed a number of alternative definitions of resilience but they all involve some form of adaptive functioning following exposure to risk. Silk et al. (2007, p. 842) defines resilience as “a dynamic process through which positive adaptation is achieved in the context of adversity”. This suggests that resilience is the ability of individuals to survive and thrive despite exposure to negative experiences (Masten & Reed, 2002). Therefore, resilience can be viewed as a process rather than a stable characteristic or trait of an individual. This includes a number of social, psychological, and biological processes through which an individual adjusts as they face demands across the life span.

The concept of resilience provides a framework for research to identify the factors related to positive adaptation (Masten & Gewirtz, 2006). Research on resilience has provided alternatives to deficit-focused models of childhood development within an environment of risk (Masten, 2001). In relation to the interest in resilience during child development, a number of investigators during the 1970's brought attention to children who displayed resilience to a risk of psychopathology and developmental problems due to genetic or environmental circumstances (for

example: Garmezy, 1971; Garmezy & Streitan, 1974; Rutter, 1979; Werner & Smith, 1982). It was suggested that the implications of this research would allow for further understanding of the etiology of psychopathology and would inform the development of interventions (Masten, 2001).

Three central constructs to the study of resiliency are risk factors, protective factors and outcome factors (Masten, 2001; Masten & Gewirtz, 2006; Masten & Reed, 2002). A risk factor refers to a measurable attribute of an individual which is related to the risk of a negative outcome. Protective factors refer to a measurable attribute of an individual which is related to a positive outcome or a lessening of a negative outcome within the presence of risk (Afifi & MacMillan, 2011; Masten & Gewirtz, 2006). Lastly, outcome factors are measurable attributes that evaluate how well the individual's life is going, such as the absence or presence of symptoms of psychopathology. In relation to the study of childhood psychopathology, most researchers define resilience as the lack of a clinical diagnosis or low levels of symptoms (Masten & Gewirtz, 2006; Masten & Reed, 2002).

2.2 Resilience in Children

Results from a wide variety of studies investigating resilience have identified a number of child, family, relationship and community protective factors (Masten & Gewirtz, 2006; Masten & Reed, 2002). These factors have been suggested to be attributes not only related to predicting positive outcomes in children at high risk of adversity but also those at low risk. Masten and Coatsworth (1998) further suggest that these attributes can be described as functional systems which assist by limiting the impact of risk factors and protecting the behavioural development of the child. A variety of diverse criteria have been used as outcome indicators of good adaptation and resilience in children (Masten & Reed, 2002). These include criteria of positive

adaptation such as school achievements, social competence and other desired behaviours (for overview see Masten & Gewirtz, 2006; Masten & Reed, 2002). Other criteria used have focused on the absence of negative outcomes, behaviours or psychopathology in children as an indication of the resilience process (Masten, 2001).

2.3 Summary of Findings on Resilience in Children

2.3.1 Risk factors. A number of different risk factors have been identified as being associated with an increase in psychopathology in children (Masten & Gewirtz, 2006). Parental psychopathology has been identified as a high risk factor in children (e.g., Beardslee, Versage, & Gladstone, 1998; Garmezy & Streitman, 1974). The development of disruptive behaviour problems has also been consistently linked to risk factors such as divorce, family instability, ineffective parenting or family discord, particularly in boys (Emery, 1982; Patterson, DeBaryshe, & Ramsey, 1989).

Maltreatment has also been identified as a risk factor for psychopathology (Cicchetti et al., 1993; Kaufman, 1991; Toth, Manly, & Cicchetti, 1992). Cicchetti et al. (1993) investigated resilience in disadvantaged maltreated children compared to a sample of disadvantaged non-maltreated children. Along with being classified as maltreated a variety of other risk factors were identified including limited maternal education, single parenting, instable relationships, and parental unemployment. The maltreated sample was found to exhibit significantly more maladaptation than the non-maltreated sample. Maltreated children were rated as displaying higher levels of aggression and disruptive behaviour; they were more withdrawn and were rated as having greater levels of internalizing behaviour problems.

An important consideration in relation to risk factors for the development of psychopathology is that a single risk factor rarely occurs in isolation (Masten &

Reed, 2002). Cumulative risk refers to the occurrence of a number of risk factors occurring together in a child's life (Masten & Gewirtz, 2006). Increasing numbers of risk factors leads to a decrease in the functioning of the child. A risk factor such as economic disadvantage is often associated with a number of other risks such as those discussed in the previous paragraph. Identifying cumulative risk is important within the application of resilience research as comprehensive interventions are required to reduce the negative impact of the variety of risks.

2.3.2 Protective factors. The investigation of factors which act as buffers against risk and are associated with better developmental outcomes has identified a variety of protective factors (Luthar, 2006; Luthar & Zigler, 1991; Masten & Gewirtz, 2006; Masten & Reed, 2002). A number of studies have investigated the role of intellectual functioning as a protective mechanism, predicting adjustment and psychological competence (Luthar & Zigler, 1991). Although the mechanisms underlying the interaction between intelligence and risk in predicting competence are unclear, some studies have found intelligence can act as a protective factor (for example: Fergusson & Lynskey, 1996; Garnezy et al., 1984; Herrenkohl, Herrenkohl, & Egolf, 1994; Masten et al., 1988). Garnezy et al. (1984) found that children with a higher IQ maintained their performance on an achievement test across both low and high levels of stress. In contrast, in children with lower IQ's there was a decline in their achievement performance at times of higher levels of stress compared to their performance at times of lower levels of stress. Research suggests that although average or above average intellectual functioning can facilitate resilience in some children, its presence is not sufficient to guarantee good developmental outcome (Herrenkohl et al., 1994). In their study examining adolescent outcomes in children from maltreating family environments, Herrenkohl

and colleagues (1994) concluded that at least average intellectual capacity was required for adolescents in their sample to meet a minimum level of success. However, on its own it was not sufficient to ensure success and resilience was a function of a number of maturational, individual and environmental factors.

Parenting quality has also been identified as a protective factor (Masten, 1994). It has been found to prevent the development of anti-social problems among children within the context of psychosocial adversity. American based studies have suggested that parent styles that provide warmth and consistent structure are associated with children who have better behaviour and more social competence (Masten & Coatsworth, 1998).

Resilience research of the risk and protective factors associated with child psychopathology provides a structure for understanding the potential pathways to either the development of psychopathology or its absence (Masten & Gewirtz, 2006). Within the area of childhood depression, investigating resilience may provide insight into the etiology of depression and inform prevention for those populations at risk.

2.4 Models of Resilience

There are two major approaches which characterise resilience research. Variable-focused approaches examine the associations among characteristics of individuals, environments, and experiences to attempt to understand what accounts for positive outcomes in adaptation within the context of risk (Masten & Reed, 2002). The second major approach is person-focused, which identifies resilient people and attempts to explain how they vary from others who are experiencing a negative outcome within the context of risk, or those who have not experienced threats. Person-focused approaches are useful for investigating the many ways in which individuals can adapt in the face of risk as it takes a holistic approach and is

particularly adept for studying individual's lives in a longitudinal process. These studies usually take the shape of either a single case study or a longitudinal study of a cohort identified to be at risk with those who display resilience within the cohort compared to those who do not. Although these approaches can provide useful information on the characteristics of individuals who show resilience compared to those who do not, the present research thesis will focus on a variable-focused approach to resilience. This allows for the investigation of specific protective factors and draws strength from the use of whole samples and multivariate statistics.

Researchers have proposed four different variable-focused models for evaluating the relationships between the risk factors, protective factors and outcome factors (Garmezy et al., 1984; Gomez & McLaren, 2006; Masten et al., 1988; McLaren, Gomez, Bailey, & Van Der Horst, 2007; Zimmerman & Arunkumar, 1994). These are the compensatory model, the risk-protective model, the challenge model and the protective-protective model. These models are not mutually exclusive; however each of these models offers a different explanation for the relationship between risk and protective factors in predicting the outcome factor.

Researchers have tested each of these models using multiple regression methods to explore the relationships between the risk, protective and outcome factors (for details see: Garmezy et al., 1984; Hollister-Wagner, Foshee, & Jackson, 2001). Cohen and Cohen (1983) suggested a number of advantages of utilising multiple regression techniques, specifically the hierarchical approach as a method of analysis. However, the major limitation of all regression techniques is that they can only ascertain the strength and direction of relationships between the factors and do not inform on the underlying causal mechanisms. The selection of variables which are included in regression analyses is therefore important and is informed by previous

research and theory, allowing the hypotheses and models to guide the regression analyses.

2.4.1 The compensatory model of resilience. The compensatory model suggests that the risk and protective factors have an additive effect on the outcome, with the risk factor increasing negative outcome and the protective factor reducing negative outcome (Hollister-Wagner et al., 2001). The operative mechanism therefore is a simple counteractive one where the protective factor reduces the negative outcome, regardless of the level of risk exposure. The compensatory model is supported when a significant main effect of the protective factor, independent of the association between risk and outcome, is found. Figure 1 depicts how compensatory factors operate to influence outcomes. The compensatory model is able to be investigated via a number of approaches, however, is usually examined with multiple regression or structural equation modelling (Fergus & Zimmerman, 2005).

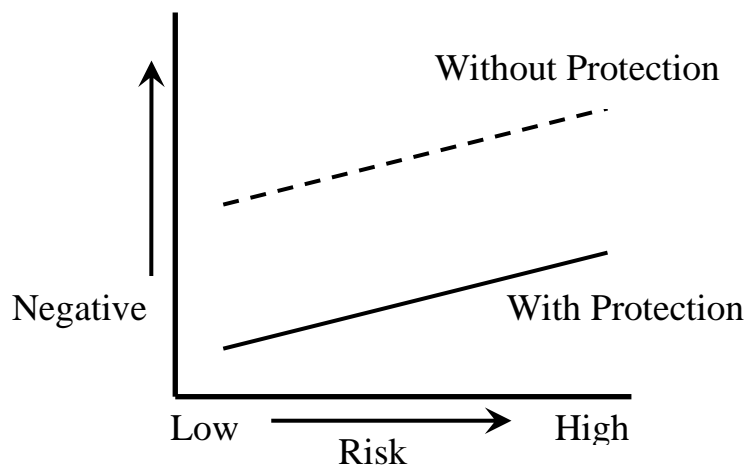


Figure 1. Graphical representation of the compensatory model of resilience. Adapted from “Adolescent Aggression: Models of Resiliency,” by G. H. Hollister-Wagner, V. A. Foshee, and C. Jackson, 2001, *Journal of Applied Social Psychology*, 31, p. 448. Copyright 2001 by V. H. Winston & Son Incorporated.

2.4.2 The risk-protective model of resilience. The risk-protective model suggests that the outcome factor is the product of the interaction between the protective factor and the risk factor; that is, the protective factor buffers the effect of the risk factor on the outcome factor (see Figure 2; Hollister-Wagner et al., 2001). A protective function is implied if, for example, individuals with high levels of a protective factor are relatively unaffected by increasing risk, whereas those low on the protective factor show worse outcome with increasing levels of risk.

The risk-protective model is statistically analysed using a hierarchical regression analysis. In Step 1 of the analysis the outcome factor is regressed on the risk factor and the protective factor. In Step 2 the outcome factor is regressed on the risk factor \times protective factor interaction term. The risk-protective model is supported if there is significant prediction by the interaction term. Support can also be interpreted from significant change in the R^2 values between Step 1 and Step 2.

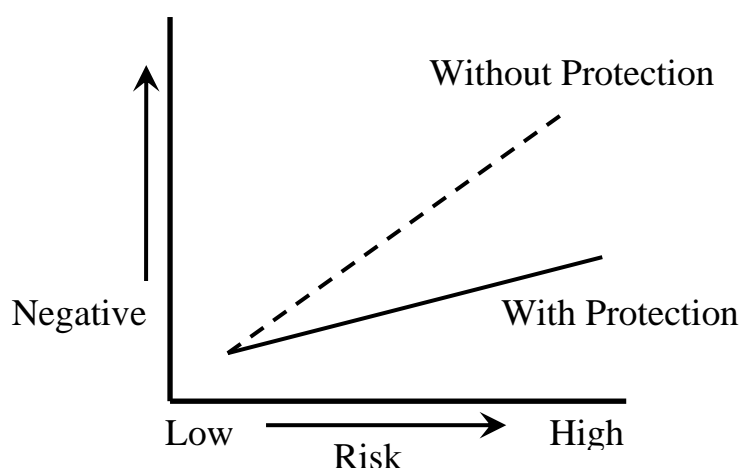


Figure 2. Graphical representation of the risk-protective model of resilience.

Adapted from “Adolescent Aggression: Models of Resiliency,” by G. H. Hollister-Wagner, V. A. Foshee, and C. Jackson, 2001, *Journal of Applied Social Psychology*, 31, p. 448. Copyright 2001 by V. H. Winston & Son Incorporated.

2.4.3 The challenge model of resilience. The challenge model implies a curvilinear relationship between the risk factor and the outcome factor (see Figure 3). In this model, exposure to both low and high levels of risk are associated with increasing negative outcomes while a small amount of exposure to risk is actually more beneficial than no exposure to risk in reducing the negative outcome (Zimmerman & Arunkumar, 1994). The suggestion is that children exposed to moderate levels of risk are confronted with enough of the risk factor to learn how to overcome or manage it but are not exposed to so much of it that overcoming it is impossible.

A vital point concerning the challenge model is that low levels of risk exposure may be beneficial because they provide children with a chance to practice skills or employ resources. The risk exposure, however, must be challenging enough

to elicit a coping response so the child can learn from the process of overcoming the risk. In challenge models, the risk and protective factors studied are the same variable; whether it is a risk or is protective for a child depends on the level of exposure.

The challenge model is examined statistically using a hierarchical regression analysis. In Step 1 the outcome factor is regressed on the risk factor. In Step 2 the outcome factor is regressed on the risk factor \times risk factor interaction term. As with the risk-protection model, support for the challenge model is indicated by significant prediction by the interaction term.

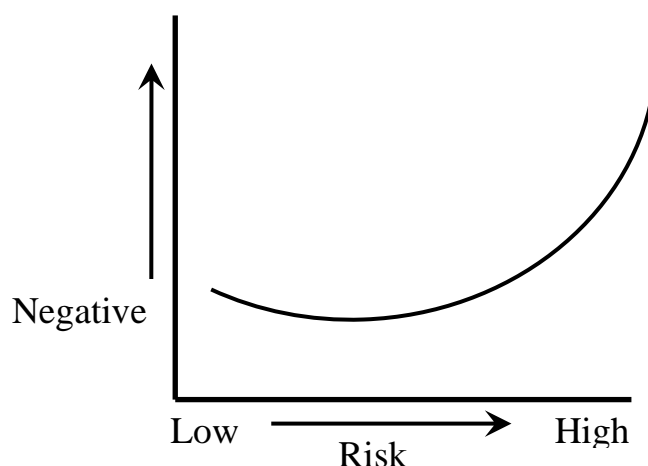


Figure 3. Graphical representation of the challenge model of resilience. Adapted from “Adolescent Aggression: Models of Resiliency,” by G. H. Hollister-Wagner, V. A. Foshee, and C. Jackson, 2001, *Journal of Applied Social Psychology*, 31, p. 448. Copyright 2001 by V. H. Winston & Son Incorporated.

2.4.4 The protective-protective model of resilience. The protective-protective model suggests that the outcome is the product of the interaction between the risk factor and the number of protective factors (Hollister-Wagner et al., 2001).

Figure 4 depicts that the number of protective factors may influence the relationship between a risk and outcome. According to this model it is predicted that the relationship between the risk and outcome will weaken as a function of the number of protective factors. That is, it proposes cumulative protection, therefore, as the number of protective factors increases the impact on the negative outcome decreases.

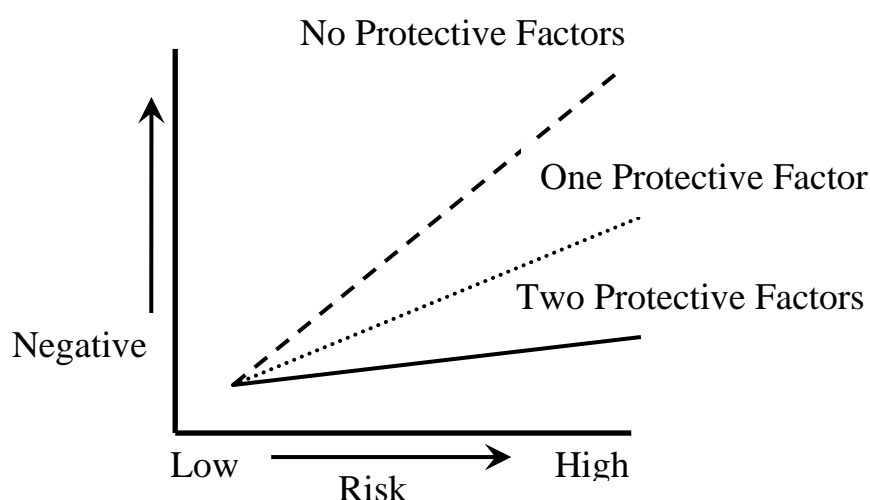


Figure 4. Graphical representation of the protective-protective model of resilience. Adapted from “Adolescent Aggression: Models of Resiliency,” by G. H. Hollister-Wagner, V. A. Foshee, and C. Jackson, 2001, *Journal of Applied Social Psychology*, 31, p. 448. Copyright 2001 by V. H. Winston & Son Incorporated.

The protective-protective model can be statistically analysed by splitting the data into groups according to the number of protective factors each participant has. Using regression analyses, the outcome measure is regressed on the risk factor and the regression coefficients compared for the different groups. Support for the protective-protective model is indicated by a reduction in the beta values which are a measure of the strength of the relationship between the risk factor and outcome as the number of protective factors increases.

2.5 Summary

In summary, resilience can be defined as the ability of individuals to survive and thrive despite exposure to negative experiences (Masten & Reed, 2002).

Resilience research increases our understanding of the relationships between risk factors and protective factors which has theoretical and practical applications (Calkins et al., 2007; Luthar, 2006). For those reasons one area which has received great attention is child psychopathology (Masten & Gewirtz, 2006). Risk factors are measurable attributes of which are related to an increase risk of a negative outcome. In relation to the outcome of child psychopathology, risk factors including parental psychopathology (Beardslee et al., 1998) and maltreatment (Cicchetti et al., 1993) have been identified. It is important to note that single risk factors do not tend to occur in isolation, rather there is a cumulation of risk factors (Masten & Gewirtz, 2006; Masten & Reed, 2002). In contrast, protective factors are measurable attributes which are related to a positive outcome or a reduction in a negative outcome. Intellectual functioning (Luthar & Zigler, 1991) and parenting quality (Masten, 1994) are two factors which have been identified as protective factors for child psychopathology.

Although there are two main approaches to resilience research, the current thesis is based on the variable-focused method. This involves investigating the prediction of an outcome factor from an identified risk factor and protective factor. Four models of resilience have been proposed by researchers to accomplish this, these are: the compensatory model, the risk-protective model, the challenge model and the protective-protective model. The following chapter will explore the specific psychopathology, outcome factor of focus for the present thesis: childhood depression.

Chapter 3

Childhood Depression

Depression is a common mental health disorder that is experienced by a large number of young people (Rudolph & Lambert, 2007). Depressive disorders during childhood are associated with significant emotional and social impairments (Rudolph & Lambert, 2007; Silk et al., 2007). These impairments can have a negative impact on children's maturity, attention, concentration, peer relationships, self-esteem and social competence, interfering with their relationships and academic functioning (Farrell & Barrett, 2007).

3.1 Prevalence of Childhood Depression

Prevalence estimates of major depressive disorder (MDD) in childhood range from 0.4 to 2.5% (Birmaher et al., 1996). A majority of children who experience depression will then go on to experience recurrent episodes and have increases rates of attempted and completed suicides, and continual psychosocial impairment between episodes (Dunn & Goodyer, 2006; Kovacs, 1996; Kovacs, Feinberg, Crouse-Novak, Paulauskas, & Finkelstein, 1984). Therefore, depressive disorders in childhood often follow a pernicious course across development, associated with ongoing impairments in social, relationship and academic/occupational functioning as they become adolescents and adults (Silk et al., 2007).

The Child and Adolescent Component of the National Survey of Mental Health and Well-Being explored the prevalence rates of depressive disorders within Australian children (Sawyer et al., 2001). Mental health problems in a sample of 3597 children aged 6-17 years of age was assessed by using parent-versions of the Diagnostic Interview Schedule for Children Version IV (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The prevalence of Depressive Disorder in

this sample of children and adolescents was 3.2% in males, 2.8% in females and 3% overall.

3.2 Childhood Depression and Resilience

Given the prevalence rates of childhood depression and the ongoing impact of depressive disorders across an individual's lifespan an important focus of research is on factors that can lead to the prevention of the first onset of depression (Silk et al., 2007). Researchers have identified a range of risk factors for childhood depression, these include parental genetic risk (Beardslee et al., 1998; Hammen & Brennan, 2003; Lau et al., 2007; Shannon et al., 2007), behavioural inhibition (Biederman et al., 2001; Ollendick, Shortt, & Sander, 2005), criticising and rejecting family relationships (Asarnow, Tompson, Hamilton, Goldstein, & Guthrie, 1994), stressful life events (Nolen-Hoeksema, Girgus, & Seligman, 1992), depressogenic cognitive style (Garber, Quiggle, Panak, & Dodge, 1991; Hammen, 1988; Lau et al., 2007; Peterson & Seligman, 1984), negative emotionality (Rothbart & Bates, 2006), negative temperamental traits (Anthony, Lonigan, Hooe, & Phillips, 2002) and neurobiological abnormalities (Ryan & Dahl, 1993).

Childhood depressive disorders can develop in individuals through a number of different pathways (Cicchetti & Toth, 1998). Researchers have identified various risk factors for depression, although as for the development of other childhood psychopathologies, the development of psychopathology tends to be associated with an accumulation of risk factors rather than the presence of a single risk (Cicchetti & Toth, 1998; Masten & Gewirtz, 2006, Masten & Reed, 2002).

3.3 Risk Factors for Childhood Depression

Investigators have identified a number of risk factors which are associated with or predict childhood depression (Silk et al., 2007). Risk factors for depression

vary from those which are characteristics of individual children, characteristics of the child's family or factors from the child's environment (Masten & Gewirtz, 2006; Masten & Reed, 2002). The following section will briefly discuss several of the strongest risk factors.

3.3.1 Cognitive style. Models of depression which have been applied to childhood depression such as the learned helplessness model focus on the risk of cognitive aspects such as thoughts and information processing (Abramson, Seligman, & Teasdale, 1978). This model reformulated for childhood and adolescent depression suggests that individuals are at an increased risk for depression if they attribute negative events which occur in their lives to internal (they direct the blame towards themselves), stable (the negative event is going to continue), and global (the event is going to impact negatively on multiple aspects of their life) causes, while attributing positive events which occur to external, unstable and specific causes. These attributional style risk factors for depression have also been found to be expressed primarily in the context of stressful life events (Alloy, Abramson, Metalsky, & Hartlage, 1988; Hilsman & Garber, 1995).

Lau et al. (2007) examined the different relationships between cognitive, social and genetic risk factors related to development of depression in children. The study had a large sample size of 300 pairs of twins. They found that negative attributional style, such as that described above, predicted depressive symptoms in children.

These findings are consistent with theories of the development of depression which indicate that certain cognitive attributional styles are a risk factor for the development of depression in children (Lau et al., 2007). Research on the cognitive diathesis-stress model of depression in children suggests that negative cognitive style

increases the risk of developing depression when stress is also present (Hilsman & Garber, 1995). Hilsman and Garber (1995) investigated negative attribution style along with other negative cognitive styles such as perceived competence and perceived control. They also found that negative cognitive style alone predicted negative affect and level of depressive symptoms.

3.3.2 Genetic. Clear associations have been well documented in the literature between maternal depression and child depression (Hammen & Brennan, 2003). Depression, as with other mood disorders have been found to aggregate within families (Klein, Lewinsohn, Rhode, Seeley, & Shankman, 2003). In relation to resilience, parental depression is one of the strongest risk factors and predictor of the development of depression in children (see Beardslee et al., 1998).

Studies have indicated that this family risk factor operates through both genetic and environmental influences (Rende, Plomin, Reiss, & Hetherington, 1993). Genetic susceptibility to depression increases from childhood through adolescents (Thapar & McGuffin, 1997). Biological evidence suggests that children with clinical internalising symptom who were exposed to maternal depression during infancy show elevated cortisol responses during childhood, indicating that these children display heightened stress reactivity to a mild stressor (Ashman, Dawson, Panagiotides, Yamada, & Wilkinson, 2002). Further, specific environmental events often increase the effect of genetic risk for depression (Eaves et al., 1997).

Shannon et al. (2007) investigated differences between maternal melancholic and non-melancholic depression as risk factors for child depression. Melancholia is a severe subtype of depression, associated with high suicide risk, depression, cognitive impairment and psychomotor disturbance. These authors used a sample of 117, -8 to 12-year old children who had been assessed as suffering from clinical

levels of conduct problems and/or depression and 63 with no psychopathology symptoms. They found that depression in children was associated with maternal melancholic depression, although not with non-melancholic depression.

It has also been suggested that paternal depression is associated with problematic affect regulation in children, heightening their risk of developing depression (Cicchetti & Toth, 1998). Zahn-Waxler and Kochanska (1990) investigated feelings of guilt in 5 to 9 year old children of depressed and non-depressed mothers. They found evidence for affect regulatory problems in the children of depressed mothers when they were presented with hypothetical situations, specifically children of depressed mothers displayed excessive arousal during the hypothetical situations related to interpersonal conflict and distress. Children of depressed mothers have been found to show a limited skill set to regulate their affect and that those strategies they do utilise are less effective than those strategies used by children of non-depressed mothers (Silk, Shaw, Skuban, Oland, & Kovacs, 2006).

3.4 Protective Factors for Childhood Depression

A number of factors have been identified which function as protective factors for childhood depression (Silk et al, 2007). As with risk factors these vary between a range of sources within the child, within the child's family and environmental influences. The following section provides a brief overview of temperament and family relationships which have been identified as protective factors.

3.4.1 Child temperament. Temperament is a characteristic of the individual child which comprises of a number of attributes (Shannon et al., 2007). These attributes can include reactivity and emotional and behavioural regulation. The experience of both positive and negative emotions in regard to onset, intensity and

duration is referred to as reactivity. Regulation however refers to the individual's ability to control their emotional and behavioural responses.

A number of behavioural characteristics have also been identified as protective factors for childhood depression (Mathijssen, Koot, & Verhulst, 1999; Shannon et al., 2007). Mathijssen et al. (1999) investigated the stability of reported internalising symptoms of a clinic referred sample. At intake they found the child's temperament as well as the quality of the family's relationships were associated with lower levels of both internalising and externalising behaviour problems. Specifically, higher levels of positive affect and sociability has also been found to predict lower self-reported anxiety and depression (Phillips, Lonigan, Driscoll, & Hooe, 2002). Further, Anthony et al. (2002) found that negative temperamental traits were related to higher levels of child depression and anxiety, whereas positive temperamental traits were related to less child depression.

3.4.2 Family relationship. Parent-child relationship characteristics as protective and risk factors have also been a focus of resilience research in children (Calkins et al., 2007). Evidence suggests that a number of characteristics of family relationships including less conflict, more synchrony, and greater shared positive affect may be important characteristics of a child's relationship with their caregiver. These factors may act as protective factors and buffer the child from psychopathology within the context of risk. This style of mother-child relationship has been termed mutually responsive orientation (Kochanska, 1997).

Carbonell et al. (2002) analysed longitudinal data collected from a sample followed from age 5 to 26 years. The study traced the psychosocial development of the sample, identifying risk and protective factors for depression across childhood, adolescents and early adulthood. Participants' perceptions of family cohesion at ages

15 and 18 years showed that resilient adolescents reported greater family cohesion at age 15 years than did participants who later developed depression. A number of family factors were identified as protective factors against the later development of psychopathology such as family cohesiveness and the individual's connection to the family.

One possible mechanism behind the protective function of family relationship is suggested to be the importance of socialisation, refinement of skills and strategies for regulating affect (Silk et al., 2007). This operates through a number of avenues during the development of the child including modelling, observational learning and social referencing.

3.5 Summary

Childhood depression is associated with significant deficits in emotional and social functioning (Rudolph & Lambert, 2007; Silk et al., 2007). Given the long term impact of depression in individuals with recurrent episodes, resilience research assists the identification of risk factors and protective factors which can inform not only treatment but prevention (Silk et al., 2007). Risk factors which have been identified to increase the risk of childhood depression include negative attributional cognitive style (Hilsman & Garber, 1995; Lau et al., 2007) and genetics, specifically parental depression which is one of the strongest risk factors identified for depression in children (Beardslee et al., 1998). In relation to protective factors, child temperament has been identified as a protective influence against childhood depression (Mathijssen et al., 1999; Shannon et al., 2007) with specific temperament traits of high levels of positive affect and sociability further identified (Phillips et al., 2002). Aspects of family relationships have also been found to provide a protective influence against the development of depression in children, including family

cohesiveness and family connections (Carbonell et al., 2002). Chapter 4 provides an introduction to TBI and its relation to depression in children.

Chapter 4

Traumatic Brain Injury and Depression in Children

TBI is a leading cause of death and acquired deficit in children and adolescents (McKinlay et al., 2008). A variety of impairments and negative outcomes are associated with TBI, ranging across cognitive, behavioural, social and emotional functioning (Ganesalingam, Sanson, Anderson, & Yeates, 2006). Although there is extensive research into the cognitive and social outcomes of paediatric TBI, there is limited research investigating emotional problems such as depression (Kirkwood et al., 2000).

4.1 Introduction to Traumatic Brain Injury

TBI is defined as “a bump, blow or jolt to the head or a penetrating head injury that disrupts the normal functioning of the brain” (Faul, Xu, Wald, & Coronado, 2010, p. 8). Not all knocks to the head result in a TBI and within those classified as a TBI there is substantial variance in severity and outcomes. Annual estimations in America suggest that TBI results in 150,000 hospitalisations and 5000 deaths in children under the age of 15 (Kraus, 1995). Research into the prevalence of TBI in Australia has shown that in a one year period between 1996 and 1997 there were 27,437 diagnoses of TBI admitted to hospitals nationwide (Fortune & Wen, 1999). Of this number around 30% (8,376) were reported to be of children aged 0-14 years. Male children made up 65% of the TBI incidents in children aged 0-14, males were also found to have higher incidence of TBI than females across all age ranges. Within Tasmania during the one year period 154 children were reported to have attended hospital for TBI (Fortune & Wen, 1999).

It is important to keep in consideration the difficulties in obtaining a true indication of the prevalence of TBI's (Fortune & Wen, 1999; McKinlay et al., 2008).

Most TBI's are mild in severity and therefore individuals may not present to a hospital emergency department or be admitted. Medical attention in some cases may not be sought or may be obtained from a GP. As the majority of studies estimating TBI rates rely on hospital data, it is likely to significantly underestimate the prevalence and incidence rates (McKinlay et al. 2008).

McKinlay and colleagues (2008) attempted to overcome the reliance on hospital data when examining prevalence rates by using a prospective longitudinal study with a large birth cohort of 1265 children born in Christchurch, New Zealand. The cohort was followed from birth until age 25. Prior to the age 16, incidents of TBI were reported to researchers by parents at regular assessments. Where required researchers were able to cross reference details from parent reports with medical records of both GP's and hospitals. The total average yearly rate of TBI per 100 children aged between 5 and 10 was 1.10, with the rate increasing to 1.17 per 100 for children aged between 10 and 15 years. For children under 15 years of age the most common sources of TBI were falls and being hit with an object. These two sources accounted for approximately 76% of TBI's in this age range. McKinlay et al. noted a difference in the identified sources of TBI's for those aged 15-25 years, where 64% resulted from rugby, assaults and car accidents.

4.2 Overview of Traumatic Brain Injury Severity

Severity of TBI is classified into three categories: mild, moderate and severe (Silver, McAllister, & Arciniegas, 2009). A number of indices are used to determine TBI severity, the most prominent of these involving the depth and length of loss of consciousness (LOC) and duration of posttraumatic amnesia (PTA).

LOC typically occurs at the time of injury to the brain and involves the inhibition of reflexes and awareness of self and surroundings (Lucas & Addeo,

2006). Neither the depth of LOC or length of LOC are usually able to be accurately reported by the individual who sustained the TBI and are often obtained from a combination of witness accounts or reports from medical personal. The Mild Traumatic Brain Injury Committee of the American Congress of Rehabilitation Medicine, Head Injury Interdisciplinary Special Interest Group (1993) grade length of LOC as:

Mild TBI LOC < 30 minutes

Moderate and Severe TBI LOC > 30 minutes

One common method used to classify TBI severity is depth of LOC, which is particularly useful for separating moderate and severe TBI and is often completed by medical professionals at the scene or on arrival at the hospital (Hinson & Ling, 2012). The Glasgow Coma Scale (GCS; Teasdale & Jennett, 1974) is a widely used test which measures the individual's motor, verbal and eye opening responses. The GCS provides a score up to 15 with lower scores being associated with poorer outcomes and is classified as follows:

Mild TBI GCS scores of 13 to 15

Moderate TBI GCS scores of 9 to 12

Severe TBI GCS scores of 8 or less

PTA refers to disruption in memory function immediately following the TBI experienced by some individuals (Lucas & Addeo, 2006). The physical trauma caused to the brain can affect the ability of the brain to encode and store new memories for a period of time with longer experience of PTA associated with poorer outcomes. PTA can be measured by the length of time from the TBI until the first memory following the injury the individual can provide. PTA is classified as follows:

Mild TBI	PTA < 1 hour
Moderate TBI	PTA for 1 hour to 24 hours
Severe TBI	PTA > 24 hours

Reviews of child and adolescent TBI research have suggested that 80-90% of TBI cases presenting to hospitals fall within the mild range of severity (Cassidy et al., 2004). Similar findings were reported by McKinlay et al. (2008) who found that only 10% of the TBI's experienced in their research birth cohort were classified to be of moderate to severe severity.

Severity of TBI has a large impact on prognosis and outcome; however, two similar TBI's can also result in vastly different outcomes and recovery (Stavinoha, Butcher, & Spurgin, 2012). There are a number of other factors which have been found to influence the potential outcomes of TBI's in children. The impact of age at injury has been the focus of some TBI research and suggests that sustaining a TBI during critical stages in the development of a child's brain can result in poorer outcomes and recovery (McKinlay, 2009). The critical period model suggests that rather than a linear relationship between age and recovery post-TBI in children, that poorer outcomes are associated with sustaining a TBI during a critical period of neurological and cognitive development. This is consistent with research that has found that developed and over-learned skills are less susceptible to influence of a TBI than skills which the child is at the point of developing at the time of the TBI, such as reading (Barnes, Dennis, & Wilkinson, 1999). This suggests that at particular ages during periods of cognitive development children are more susceptible to poorer outcomes post-TBI, with recovery influenced by the child's current stage of brain development.

Generally, recovery from TBI is a process which occurs over time with children following moderate to severe TBI's showing most improvement in their functioning during the first year post injury (Fay et al., 2009). Therefore with increasing time since sustaining the TBI some initial difficulties may see recovery, although, particularly given the developmental processes occurring during childhood novel impairments may also arise during the recovery process. In fact some researchers have found that while cognitive functioning may show an improvement through the first year following the TBI, during this post-TBI period emotional and behavioural difficulties increase (Yeates, et al., 2001).

4.3 Summary of Research on Traumatic Brain Injury and Depression

A common feature of TBI is disruption to the structure and functioning of the frontal lobe, specifically the prefrontal cortex (Wilde et al., 2005). Damage to the frontal lobe has the potential to affect the individuals understanding of emotional expression, the control of emotional expression, and emotion regulation (Mathias & Coats, 1999; Silver et al., 2009; Wilde et al., 2005). Disruption to the prefrontal cortex is also believed to be associated with a number of difficulties in relation to emotions due to its connections with the limbic and midbrain systems which are involved in the processes of generating and interpreting emotions and facial expressions. The following section reviews research investigating TBI and depression in adults and paediatric populations.

4.3.1 Adult research. Research investigating psychiatric outcomes of TBI is a growing area, although it remains far behind research regarding cognitive outcomes (Mathias & Coats, 1999). Even so, research indicates that depression is one of, if not the most common psychiatric outcome of TBI's in adults (Rapoport, 2012).

Estimates of the rate of depression following TBI vary greatly within the adult literature between 10% and 77% (Bombardier et al., 2010). A number of reasons for this large disparity in the research have been suggested, including differences in criteria used for depression and the methodology selected and the characteristics of the samples selected.

A recent study conducted by Bombardier et al. (2010) investigated the rate of diagnosed MDD within a sample of adults over a period of a year post-TBI. The large sample was of adults hospitalised with TBI's ranging in severity from complicated mild to severe. Overall 53.1% of the sample met criteria for MDD during the first year following their TBI. When previous history of MDD was controlled for it was found that 23.3% of the sample experienced MDD for the first time. Results further indicated that previous history of MDD is a risk factor for TBI and there were no differences found in the rates of MDD between the different TBI severity groups. Bombardier and colleagues suggest caution in transferring these findings to uncomplicated mild TBI.

As the vast majority of TBIs are mild in severity research has investigated the emotional functioning of adults post mild TBI and compared it to a control group (Mathias & Coats, 1999). Emotional and behavioural functioning was assessed via self-report and observer report (friend or family member of participant) on the Neuropsychology Behavior and Affect Profile (NBAP; Nelson, Satz, & D'Elia, 1994), Neurobehavioural Rating Scale-Revised (NRS-R; Levin et al., 1987) and the Headley Court Psychosocial Rating Scale (HC; Malia, Powell, & Torode, 1995). It was found that the mild TBI group self-reported higher post-injury levels of depression than the control group. It was also found that the self-reported premorbid levels of depression symptoms were higher for the mild TBI group than the control

group. However when this was taken into account both self-report and observer reports suggested that there was a significant increase in the level of depression in the mild TBI group following their injury. The level of depression was also found to be related to the level of injury-related psychological distress experienced by the mild TBI group. This suggests that following uncomplicated mild TBI there is an increased risk of depression symptoms.

4.3.2 Childhood research. Although not as extensive as the adult literature, there is growing research into the psychiatric outcomes of paediatric TBI (Kirkwood et al., 2000). An early prospective study conducted by Max et al. (1997, 1998) investigated predictive factors of novel psychiatric disorders post-TBI in children. A sample of 43 children aged between 6 and 14 years of age were assessed as soon as possible following the TBI with follow up assessments conducted within the first 12 months post-TBI. Standardised instruments were used to assess novel psychiatric diagnoses with Diagnostic and Statistical Manual (*DSM-III-R*; American Psychiatric Association, 1987) criteria and both parents and children were interviewed using The Schedule for Affective Disorders and School-Age Children epidemiological (K-SADS-E; Orvaschel, Puig-Antich, Chambers, Tabrizi, & Johnson, 1982) version and The Schedule for Affective Disorders and School-Age Children present episode (K-SADS-P; Chambers et al., 1985) version.

At the 12 month assessment 16 of the 43 children met criteria for a novel psychiatric disorder the most common of these being Oppositional Defiant Disorder (ODD) and ADHD. It was found that family history of psychiatric disorders, family functioning, the child's behaviour/adaptive functioning and SES and pre-injury intellectual functioning significantly predicted the presence of novel psychiatric disorder 6 to 12 months post-TBI. Within the first 6 month period post-injury, TBI

severity was found to also significantly predict occurrence of novel psychiatric disorder, however during the 6 to 12 month period it was no longer significant.

Follow-up assessment conducted by Max and colleagues (1997) during the 12 to 24 month period post-TBI found that 15 of the remaining 42 children met criteria for a novel psychiatric disorder, most of which (11) persisted from previous 12 month assessments. ODD and ADHD remained the most common diagnoses. As with the previous assessment, lower family functioning significantly predicted presence of novel psychiatric disorders. It was also found that TBI severity and the presence of psychiatric disorder at time of TBI also significantly predicted the presence of novel psychiatric disorder during the second year post-injury. One limitation with this research was the overrepresentation of children with a severe TBI within the sample compared to all children who had presented to the hospital with TBI. This may be reflected in an overestimate of the rate of novel psychiatric disorders reported. These findings suggest that as with adult TBI studies, there is a risk of psychiatric disorders presenting in children post-TBI.

Bloom et al. (2001) investigated the lifetime and novel psychiatric disorders in children aged 6 to 15 years at 1 year post-TBI. Severity of TBI in the sample of 46 children ranged from mild to severe based on GCS score and evidence of intracranial lesion. Assessment of psychiatric disorders was conducted by semi-structured interviews with the child and parent separately using the Diagnostic Interview for Children and Adolescents-Revised (DICA-R; Reich, Leacock, & Shanfeld, 1995). The DICA-R assesses criteria for diagnosis based on the *DSM-IV* (American Psychiatric Association, 1994). In combination with the semi-structured interviews, a series of questionnaires were also administered including the Children's Depression Inventory (CDI; Kovacs, 1992) and the Inventory of Depressive

Symptomatology-Self Report (Rush et al., 1986) to provide a self-report of depression.

It was found almost 60% of the sample met criteria for a novel psychiatric disorder 1 year following the TBI with ADHD and depression the most common disorders. Depression included: major depressive disorder, depressive disorder-NOS and dysthymia which made up 25% of the novel psychiatric disorders present. For the majority (60%) of children who met criteria for a novel depression disorder it had resolved by 1 year post-TBI. It was also found that although those children who had sustained a moderate or severe TBI were more likely to develop a novel psychiatric disorder than those with a mild TBI, this difference was not significant. These exploratory findings support the prospective studies by Max et al. (1997; 1998) suggesting an increased risk of psychiatric disorders post-TBI in children. Bloom et al., (2001) further highlighted an increase in internalising disorders, specifically depression.

The prevalence and predicting factors of depression in children following TBI were examined by Kirkwood and colleagues (2000). To overcome some of the limitations in previous research, a sample of 89 children hospitalised with moderate (51 children) to severe (38 children) TBI were compared to a sample of 55 children hospitalised for orthopaedic injuries. Children in both samples were aged between 6 and 12 years. Assessments included a rating of pre-injury behaviour completed by parents, baseline child and family assessments conducted within three weeks of the hospitalisation and then follow up assessments at 6 and 12 months post-injury. Depression was measured using the CDI, a self-report measure completed by children and ratings made by parents using the Child Behavior Checklist (CBCL;

Achenbach, 1991). Measures of SES, family functioning, general intellectual functioning and verbal memory were also obtained.

It was found for both the moderate and severe TBI groups that the majority did not present with clinical range depression symptoms at the 6 and 12 month follow ups. In comparison to the levels of depression symptoms reported by children in the orthopaedic sample, the children in the TBI group reported comparable levels of depressive symptoms soon after the injury however this level remained consistent across the 12 months post-injury whereas levels of depression symptoms in the orthopaedic sample significantly declined over time. Parents of children in the TBI group rated significantly more depression symptoms than the parents of children in the orthopaedic group at both follow up assessment points. SES was also found to be associated with both child and parent ratings of depression with lower SES associated with increased depressive symptoms, suggesting that it may be a risk factor for depression.

In a similar investigation Luis and Mittenberg (2002) also compared children following mild TBI, moderate/severe TBI and an orthopaedic control group. Focusing on children's self-reports of mood/anxiety symptoms post-injury, assessments were conducted using interviews with Module A: Anxiety Disorders and Module C: Mood Disorders from the DISC-IV (Shaffer et al., 2000). Consistent with previous research it was found that following TBI children are at an increased risk for novel mood and anxiety disorders, including children who experience a TBI of mild severity. Children who developed a novel psychiatric disorder were found to have lower initial GCS scores than those who did not develop a psychiatric disorder which is consistent with previous research indicating that there is a relationship

between TBI severity and presence of novel psychiatric disorder (Bloom et al., 2001; Max et al., 1997; 1998).

4.4 Summary

TBI is often associated with frontal lobe damage which has the potential to detrimentally affect a range of emotional competencies (Mathias & Coats, 1999; Silver et al., 2009; Wilde et al., 2005). This is consistent with findings that children post-TBI display impaired emotion regulation functioning (Ganesalingam et al., 2006) and are at an elevated risk for depression symptoms (Kirkwood et al., 2000; Luis & Mittenberg, 2002). Further research exploring the emotional consequences of paediatric TBI is required given the suggested deficits, the prevalence of particularly mild TBI and the long-term impact of depression on children's psychological, social and academic functioning. Exploration of these factors has practical and theoretical application for the rehabilitation of families coping with paediatric TBI. Chapter 5 provides an overview of the current study.

Chapter 5

Current study: Childhood Depression, Negative Affect and Emotional Intelligence

There are numerous avenues for future research into child resilience (Luthar & Zigler, 1991). One area which has been understudied is the specific application of resilience models in relation to childhood depression. The application of models of resilience to research on depression in children allows the opportunity to extend understanding into potential risk and protective factors (Zimmerman & Arunkumar, 1994). Knowledge of these factors informs development of prevention and treatment programs which is important given the prevalence rates and the ongoing impairments associated with childhood depression (Garmezy et al., 1984; Masten et al., 1988; Silk et al., 2007; Zimmerman & Arunkumar, 1994).

Adult resilience literature has provided evidence suggesting several individual characteristics are potential protective factors (Luthar, 2006). Emotional intelligence has been associated with better psychological functioning and is one of these areas which are yet to be fully examined in relation to child resilience, specifically to childhood depression.

Further, exploring the application of the models of resilience to investigating the association of depression in children to risk and protective factors following TBI will add to the growing understanding of this area, highlighting areas for further research and inform rehabilitation practices. An example of the application of risk and resilience models to childhood depression follows. The identified risk factor for childhood depression is negative affect and the protective factor is emotional intelligence. The following section provides a summary of the research relating to

these factors and childhood depression and how the models of resilience would apply to research of these factors.

5.1 Childhood Depression and Negative Affect

Negative affect is defined as a broad general factor of emotional distress which includes such core emotions as fear, sadness and anger (Clark, Watson, & Mineka, 1994; Laurent et al., 1999). Negative affect as a general state of distress has long been associated with the stable personality factor of neuroticism which involves an increased likelihood of experiencing negative affect (Muris & Ollendick, 2005). It represents the extent to which an individual is disposed to be sensitive to negative stimuli and hence, feels upset or unpleasantly engaged rather than peaceful (Anderson & Hope, 2007; Clark et al., 1994).

Negative affect also has pervasive influences on mood, self concept and world view (Muris & Ollendick, 2005). Therefore it is not surprising that there is well established evidence that high negative affect (or neuroticism) is involved in the development of child psychopathology, in particular internalising disorders such as anxiety and depression (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Clark, 2005; Clark, Vittengl, Kraft, & Jarrett, 2003; Lonigan, Phillips, & Hooe, 2003; Muris & Ollendick, 2005). Research indicates that stressful negative events contribute to negative affect and depressive symptoms in children (McMahon, Grant, Compas, Thrum, & Ey, 2003; Compas, Grant, & Ey, 1994).

Consistent with the association of negative affect and depression are studies where correlations between negative affect and depression have been found (Laurent et al., 1999; Lonigan, Hooe, David, & Kistner, 1999). From a sample of 110 children in grades 3 to 5, Crook, Beaver and Bell (1998) reported a significant correlation of .66 between the negative affect scale from the Positive and Negative

Affect Schedule for Children (PANAS-C; Laurent et al., 1999) and self-report depression symptoms. Lonigan et al. (2003) reported results from a study of 270 children in grades 4 to 11 where self-ratings on the negative affect scale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) substantially correlated with self-report symptoms of depression on the CDI. Studies have shown that negative affect is associated with depression and these findings suggest that negative affect is a risk factor for depression.

Within the childhood TBI literature no studies were found which measured negative affect directly; however, children have been found to display deficits in their regulation of emotions, such as displaying less emotional awareness, less empathy, reduced frustration tolerance, emotional lability/negativity and increases in mood swings (Ganesalingam et al., 2006). Ganesalingam et al. (2006) studied the impact of childhood TBI on self-regulation and social and behavioural functioning. The sample included children with moderate to severe TBI 2 to 5 years post-injury and a sample of uninjured children, all between the ages of 6 and 11 years. Self-regulation included the component of emotion regulation as measured by parent report. It was found that compared to the uninjured group, parents of TBI children reported greater impairments in emotion regulation, including exhibiting more poorly regulated negative affect. Further, emotion regulation was found to account for a larger portion of the variance in predicting social and behavioural functioning than cognitive or behavioural regulation. As negative affect has been found to be associated with higher self-reports of depression symptoms in children (Crook et al., 1998; Lonigan et al., 2003) and paediatric TBI is associated with a number of deficits in emotion regulation and parents report increases in lability/negativity this raises the

possibility of negative affective as a risk factor for depression in children following TBI.

5.2 Childhood Depression and Emotional Intelligence

In contrast to negative affect, emotional intelligence has been associated with better and more adaptive psychological functioning (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Emotional intelligence is defined as the ability to monitor one's own and other people's emotions, to discriminate between different emotions and label them appropriately, and to use emotional information to guide thinking and behaviour. Emotional intelligence develops in individuals from infancy and continues through childhood and adolescence into adulthood (Zeidner, Matthews, Roberts, & MacCann, 2003). Its development is influenced by many factors including the child's social, cognitive and biological development. For example, between ages 8 – 11 years, as children's cognitive and social skills develop they become able to manage their emotions depending on the requirements of the present social situation (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). This may involve either concealing their current emotion if it is not socially acceptable or expressing it in an appropriate manner. Emotional intelligence skills, which include emotion regulation continue to further develop during mid – late childhood transforming from becoming largely behaviour based to cognitively. Regulating one's own emotions through cognitive means is believed to develop by the age of 8 – 9 years (Garnefski, Rieffe, Jellesma, Terwogt, & Kraaij, 2007).

The Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) provides a measure of the knowledge individuals have about their own emotional abilities. The three components are: emotional attention, which refers to the individuals perceived ability to identify what they are feeling; emotional clarity, which refers to the ability

to discriminate between different emotions; and mood repair, which refers to the perceived ability to regulate one's emotions if required (Rockhill & Greener, 1999).

It is suggested that individuals who have the skills to identify their emotions, discriminate between emotions and possess the capacity to regulate their emotions would be less prone to depression symptoms (Salovey et al., 1995). Research is consistent with this suggestion. Rude and McCarthy (2003) investigated the relationship between emotional functioning and depression in a sample of 132 college students. They reported that depressed individuals scored significantly lower on measures of emotional attention and emotional clarity as measured by the TMMS than non-depressed individuals.

Further support has been reported from a study examining the relationship between emotional intelligence and depression in adolescents (Fernández-Berrocal, Alcaide, Extremera, & Pizarro, 2006). With a sample of 250 high school students it was found that self-report emotional intelligence as measured by the TMMS was negatively related to self-report depression. In relation to the specific components of emotional intelligence, the ability to discriminate between different emotions (emotional clarity) and the ability to regulate emotions (mood repair) were significantly negatively correlated with depression, suggesting that emotional intelligence is an important ability that contributes to psychological functioning.

In relation to children, Rockhill and Greener (1999) modified the adult version of the TMMS to assess the ability of elementary school children to self-report emotional intelligence (Trait Meta-Mood Scale for Elementary School Children; TMMS-C). With a sample of 691 children from grades 3 to 7 they reported that children were capable of reporting emotional attention (perceived ability to identify what emotion they are feeling, emotional clarity (perceived ability

to discriminate between different emotions) and mood repair (perceived ability to regulate one's emotions). Examining the relationship between these measures and self-report depression measured using the CDI they reported significant negative correlations between both clarity and repair with depression.

These findings are consistent with the suggestion that depressive symptoms are associated with problems regulating affect, specifically as a failure to regulate negative emotions (Cole & Kaslow, 1988; Garber, Braafladt, & Weiss, 1995; Garber, Braafladt, & Zeman, 1991). As depressed children have more difficulty regulating negative emotions they also tend to use strategies more passive, less effective to regulate their affect compared to non-depressed children and have lower expectations of strategies suggested by others to regulate affect (Garber et al., 1995; Garber, Braafladt, & Zeman, 1991). This raises the possibility that emotional intelligence is a protective factor for depression.

Research has found that the prefrontal cortex is of great importance for emotional intelligence and that deficits in emotion recognition and understanding can occur in both adults and children following TBI (Granacher, 2008; Krueger et al., 2009). In adults studies have found deficits in facial emotion recognition (Croker & McDonald, 2005; Green, Turner, & Thompson, 2004) and also in theory of mind (Bibby & McDonald, 2005; McDonald & Flanagan, 2004). Similar deficits in facial and verbal emotion recognition and also in theory of mind have been found in children and adolescents following TBI (Henry, Phillips, Crawford, Ietswaart, & Summers, 2006; Snodgrass & Knott, 2006; Tonks, Williams, Frampton, Yates, & Slater, 2007).

Emotional intelligence has been identified as a potential protective factor for depression in uninjured children. Although research indicates that TBI is associated

with impairments in some of the skills associated with emotion recognition, it has yet to be investigated whether emotional intelligence can act as a protective factor for depression in children post-TBI. Exploring this relationship has the potential to assist in informing post-TBI assessments and therapies.

5.3 Summary

Applying the models of resilience to the proposed factors provides a method to depict the concurrent effects of negative affect (the risk factor) and perceived emotional intelligence (the protective factor) on depression (the outcome) in children. As by middle childhood children have developed emotional intelligence skills and the ability to regulate their emotions, exploring these as protective factors at this age can inform therapeutic interventions and childhood prevention strategies. Further, explorative studies of these models and factors in children post-TBI extends current understanding of the risk and protective factors in child TBI samples and informs post-TBI assessment and interventions. Models of resilience are not mutually exclusive and will inform on the association of both negative affect and emotional intelligence to depression separately and if emotional intelligence buffers the relationship between negative affect and depression. Chapter 6 details the method and results from Study 1.

Chapter 6

Study 1: Association of Negative Affect and Emotional Intelligence with Depression among Children: Applicability of Resilience Models

6.1 Aims and Hypotheses

The aim of Study 1 was to examine the applicability of the four models of resilience depicting the concurrent effects of negative affect and emotional intelligence on depression in children (as detailed in Chapter 5).

6.1.1 Compensatory model. It was hypothesised that high level of negative affect would correlate positively, while high level of the separate components of emotional intelligence (emotional attention, emotional clarity and mood repair) would correlate negatively to the prediction of depression.

6.1.2 Risk-protective model. It was hypothesised that high level of the separate components of emotional intelligence (emotional attention, emotional clarity and mood repair) would reduce the strength of the relationship of negative affect with depression.

6.1.3 Challenge model. It was hypothesised that depression would have a curvilinear relationship with negative affect, such that moderate level of negative affect would have little or no impact on the level of depression, when compared to high and low level of negative affect.

6.1.4 Protective-protective model. It was hypothesised that the level of depression would be low for those with high level of emotional attention, emotional clarity and mood repair compared to those with either high level of only one or two of the protective factors and that the latter group would have lower depression compared to those with no high level of any of the protective factors.

6.2 Method

6.2.1 Participants. A total of 82 primary school children took part in Study

1. Participants were recruited from four government primary schools within Southern Tasmania. Approximately 16% of parents contacted consented for their child/children to participate in Study 1. It is unclear as to why the response rate from parents was so low. Due to the method used to contact parents (letter sent home through the child's school) it was not possible to gather information regarding why they chose not to participate. It is possible one main reason for the low participation rate was that active consent was used rather than passive.

Demographic characteristics were not collected for 37 participants at the time of testing, however, invites to participate were only provided to parents of children within the required age range (8 to 11 years of age). Overall sex totals were collected from this sample from names on the completed consent forms which were separate from the questionnaire booklets. Sex, age and grade characteristics were collected for the remaining 45 participants (24 males and 21 females); the following demographic data is from this sub-sample (see Appendix A for analyses).

Participants ranged in age from 8 to 11 years ($M = 9.84$ years, $SD = 0.98$). The mean age of male participants was 9.92 years ($SD = 0.97$), while the mean age for female participants was 9.76 years ($SD = 1.00$). Males and females did not significantly differ in age, $t(43) = 0.53$, $p = .60$. Participants ranged in grade from 2 to 6 ($M = 4.16$, $SD = 1.09$). The mean grade for male participants was 4.29 ($SD = 1.04$), while the mean grade for female participants was 4 ($SD = 1.14$). Male and female participants did not significantly differ in grade, $t(43) = 0.90$, $p = .38$.

6.2.2 Materials. Three self-report questionnaires were used to collect data in this study, the PANAS-C (Laurent et al., 1999); the TMMS-C (Rockhill & Greener, 1999) and the Short Mood and Feelings Questionnaire (SMFQ; Angold et al., 1995).

The PANAS-C is a 30 item adjective rating scale used to assess affect in children in Grades 4 to 8 (Laurent et al., 1999). It consists of two scales, Positive affect and negative affect, each consisting of 15 items. The positive affect scale items include “interested”, “happy” and “calm”. The negative affect items include “frightened”, “upset” and “lonely”. Participants were provided with the instructions:

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answers next to that word. Indicate to what extent you have felt this way during the past few weeks.

Each item is rated on a 5-point Likert-type scale. The scale choices are *very slightly or not at all* (rated 1); *a little* (rated 2); *moderately* (rated 3); *quite a lot* (rated 4); and *extremely* (rated 5).

PANAS-C questionnaires were scored according to Laurent et al. (1999). Only the negative affect scale was used for the current study. The score for negative affect was calculated by summing the scores for the 15 relevant items. Raw scores ranged from 15-75. Higher scores indicated experiencing greater levels of negative affect.

Laurent et al. (1999) provided evidence of the psychometric properties of the PANAS-C. The internal reliability coefficient alphas for the 15-item positive affect scale were .89 and .87 respectively, in the measurement development and replication samples. The internal reliability coefficient alphas for the 15-item negative affect

scale were .94 for the measurement development sample and .92 for the replication sample.

Preliminary scale validation of the PANAS-C was explored using a school sample and an inpatient sample (Laurent et al., 1999). Good convergent and discriminant validity was demonstrated. The positive affect scale has been found to correlate negatively with the CDI and moderately correlated with the Trait Scale from the State Trait Anxiety Inventory for Children (STAIC; Spielberger, Edwards, Lushene, Montouri, & Platzek, 1973) in both the general and clinical samples. In relation to the negative affect scale, Laurent et al. (1999) found that it positively correlated with other self-reports/measures of depression and anxiety.

The TMMS-C (Rockhill & Greener, 1999) is a self-report measure developed to assess emotional intelligence in elementary school children. It is adapted from the adult version of the TMMS. The TMMS-C consists of 16-items and provides an overall measure of emotional intelligence made up of 3 subscales. The subscales are emotional attention: the child's self-reported ability to attend to emotions (7-items); emotional clarity: the child's self-reported ability to discriminate between emotions (5-items); and mood repair: the child's self-reported ability to regulate their moods (4-items).

For the TMMS-C participants were instructed to: "read each statement and decide whether or not you agree with it. Circle the appropriate answer next to each statement". Examples of items include "I pay a lot of attention to how I feel" (emotional attention item); "I usually know how I feel about things" (emotional clarity item); "If I find myself getting mad, I try to calm myself down" (mood repair item). Participants were asked to respond on a 5-point Likert-type scale, ranging

from *not at all true* (rated 1); *hardly ever true* (rated 2); *sometimes true* (rated 3); *often true* (rated 4); to *always true* (rated 5).

Completed TMMS-C questionnaires were scored according to Rockhill and Greener (1999). Separate scores for emotional attention, emotional clarity and mood repair were calculated by summing the scores for the relevant items. Scores for the two reverse items were recoded. Raw scores ranged from 7-35 for emotional attention; 5-25 for emotional clarity and 4-20 for the mood repair scale. Higher scores on each of the scales indicate greater levels of emotional attention, emotional clarity and mood repair.

Rockhill and Greener (1999) investigated the psychometric properties of the TMMS-C. They reported internal consistency with Chronbach's alphas for the three subscales of .70 (emotional attention); .58 (emotional clarity) and .76 (mood repair). The measure was also found to have good convergent validity with the emotional attention and mood repair scales significantly negatively correlating with depression as measured by the CDI. Emotional attention, emotional clarity and mood repair were also found to correlate significantly with self-reports of overall life satisfaction.

The SMFQ is a 13-item scale designed to provide a quick self-report measure of core depression symptoms in children and adolescents aged between 6 – 16 years (Angold et al., 1995). The scale was developed from the 34-item Mood and Feelings Questionnaire (MFQ; Costello & Angold, 1988).

Participants were provided with the following instructions:

This form is about how you might have been feeling or acting recently. For each question, please check how much you have felt or acted this way in the past two weeks. If a sentence was true about you most of the time, check

true. If it was only sometimes true, check sometimes. If a sentence was not true about you, check not true.

Examples of items include “I didn’t enjoy anything at all”, “I found it hard to think properly or concentrate” and “I cried a lot”. Each of these statements are rated as either being *true* (scored 2); *sometimes true* (scored 1); or *not true* (scored 0).

Completed SMFQ’s were scored according to Angold et al. (1995). The score for depressive symptoms was calculated by summing the scores of all 13-items. Raw scores ranged from 0-26. Higher scores indicate greater levels of depression.

The SMFQ has good internal reliability with a Chronbach’s alpha of .85 (Angold et al., 1995). It also correlates moderately highly with more comprehensive measures of depression, including the CDI ($r = .67$) and the Diagnostic Interview Schedule for Children (DISC; $r = .65$). Angold et al. (1995) also reported that the SMFQ can discriminate between clinically referred child psychiatric samples and unselected controls, while can also discriminate between depressed and non-depressed children from a general population sample.

The SMFQ provides one overall measure of depressive symptoms, with higher scores indicating higher levels of depression. Angold et al. (1995) found a cut- off score of 8 or higher achieved 60% sensitivity and 85% specificity for major depression.

6.3 Procedure

Study 1 received ethical approval from the Tasmanian Social Sciences Human Research Ethics Committee (ethics reference number: H10299; see Appendix B). Approval was then obtained from the Educational Performance Services, Department of Education (see Appendix C). During the running of the study an ethical amendment was also approved by the Tasmanian Social Sciences Human

Research Ethics Committee to include collection of demographic information, which had previously not been included. The change was also submitted to the Educational Performance Service.

Overall 18 government primary schools located in Southern Tasmania were approached to participate in the present study. Schools were initially randomly selected from groups based on their index of relative socioeconomic advantage and disadvantage for the relevant postcode (Australian Bureau of Statistics, 2008). The number of schools randomly selected from within each group was determined to provide a representative sample of the socioeconomic indices of the region.

However, due to the limited number of schools agreeing to participate, the present sample was not representative as there was an overrepresentation of rural schools in lower socioeconomic areas.

Principals of the selected primary schools were initially approached either by mail or email and were provided with a cover letter, a plain language statement (see Appendix D), and copies of the study forms (child and parent information sheets and consent forms) and the questionnaire booklet. Of the 18 schools approached, four agreed to participate in the study.

Once agreement to participate was obtained from school principals, children were invited to participate in the study via letters sent home to parents. Three schools were provided with the letters which contained an information sheet, consent form (see Appendix E for parent/guardian information sheet and consent form) and reply paid envelope addressed to the student researcher at the University of Tasmania. Schools distributed these to parents with children within the age range of 8 – 11 years. Parents who consented for their children to participate were asked to complete the consent form and return it to the student researcher using the supplied

replied paid envelope. One school distributed copies of the information sheet and consent form to parents and requested that parents return completed consent forms to the school. Consent forms were collected from that school by the researcher.

The study measures were completed by children at school in a classroom setting in groups of 4-12 students. Children were provided with an information sheet which was also verbally administered and a consent form (see Appendix F for child information sheet and consent form) which the researcher also verbally administered. Children were provided with the option of not participating in the study and returning to class, one child chose not to participate in the study at this stage.

Children were then provided with the questionnaire booklet containing the three measures and asked to complete the demographic questions on the cover. It was explained to the children that the questionnaire booklet was not a test, there were no right or wrong answers, and that their responses would remain anonymous. Children were encouraged to complete the questionnaires independently and were asked to try not to think too long on each answer.

The researcher verbally administered the standard instructions for each of the three measures and explained the response choices. Clarification was provided on any items participants were unsure about. The questionnaire booklet took approximately 20 to 30 minutes to complete.

6.4 Data Analysis

The compensatory, risk-protective, challenge and protective-protective models were tested using the multiple regression methods proposed by Garmezzy et al. (1984). All models were tested in separate analyses. For the compensatory model, the outcome factor (depression) was regressed on the risk factor (negative affect) and the relevant protective factor (emotional attention, emotional clarity and

mood repair) in separate analyses. Significant prediction by both the risk factor (negative affect) and the relevant protective factor (emotional attention, emotional clarity and mood repair) would indicate support for the compensatory model.

For the risk-protective model hierarchical regression analyses were performed where in Step 1 the outcome factor (depression) was regressed on the risk factor (negative affect) and the relevant protective factor (emotional attention, emotional clarity and mood repair) in separate analyses. In Step 2 the outcome factor (depression) was regressed on the interaction term of the risk factor (negative affect) \times the relevant protective factor (emotional attention, emotional clarity and mood repair). Significant prediction by the interaction term would indicate support for the risk-protective model. Support for the risk-protective would also be found in a significant change in the R^2 values between Step 1 and Step 2.

For the challenge model a hierarchical regression analysis was performed where in Step 1 the outcome factor (depression) was regressed on the risk factor (negative affect). In Step 2 the outcome factor (depression) was regressed on the interaction term of risk factor \times risk factor (negative affect \times negative affect). Significant prediction by the interaction term would indicate support for the challenge model.

For the protective-protective model, participant's scores were recoded to reflect if their raw score on each of the three emotional intelligence subscales was above the mean (1) or below the mean (0). The sample was then split into those with 0, 1, 2 and 3 protective factors. The regression coefficients of the prediction of the outcome factor (depression) by the risk factor (negative affect) were then compared for those with 0, 1, 2 and 3 protective factors. Support for the protective-protective

model would be indicated by reduction in beta values as the number of protective factors increases.

Data for the 82 children who participated in Study 1 is provided in Appendix G.

6.5 Results

All statistical analyses for Study 1 were performed using SPSS version 17.0 for windows and an alpha level of .05. Output from SPSS analyses for Study 1 is provided in Appendix H. A power analysis conducted indicates that 59 participants are required to obtain a power of .80.

6.5.1 Descriptive scores and correlations between measures. Table 1 presents the mean and standard deviation scores for negative affect, emotional attention, emotional clarity, mood repair, number of protective factors and depression for the sample. It also shows the intercorrelations between all study measures. As shown, the correlation between negative affect and depression was positive and highly significant ($p < .001$). Depression also correlated negatively with emotional clarity and mood repair, although the latter correlation was not significant. These results suggest that higher levels of negative affect were associated with higher levels of depression symptoms. They also suggest that higher levels of emotional clarity and mood repair were associated with lower levels of depression.

Table 1

Descriptive Statistics and Correlations for all Study 1 Measures

	1	2	3	4	5	6
<i>Correlations</i>						
1. Negative affect	-	.02	-.27*	.03	-.19	.68***
2. Emotional attention		-	.26*	.34**	.27*	.03
3. Emotional clarity			-	.34**	.74***	-.42***
4. Mood repair				-	.68***	-.16
5. Number of protective factors					-	-.30**
6. Depression						-
Mean	26.50	22.60	17.70	14.20	1.00	5.67
Standard deviation	9.93	4.72	4.09	4.26	0.80	5.37

Note. $N = 82$.

* $p < .05$; ** $p < .01$; *** $p < .001$.

6.5.2 Testing the compensatory model. To test the compensatory model depression was regressed on negative affect and each of the protective factors in separate analyses. Table 2 presents the results. As shown, for emotional attention there was a significant prediction by negative affect, however emotional attention was not significant. This did not provide support for the compensatory model.

Table 2 also shows that for emotional clarity, there were significant predictions by negative affect and emotional clarity. Significant predictions were also found for mood repair, with significant predictions by both negative affect and mood repair. The significant findings for both emotional clarity and mood repair provide support for the compensatory model.

Table 2

Results from the Study 1 Regression Analyses for Testing the Compensatory Model

	<i>b</i>	<i>SE</i>	β	<i>t</i>
<i>Protective factor = emotional attention</i>				
Negative affect	.37	.05	.68	8.13***
Emotional attention	.02	.09	.02	0.21
<i>Protective factor = emotional clarity</i>				
Negative affect	.33	.04	.61	7.46***
Emotional clarity	-.33	.11	-.25	-3.10**
<i>Protective factor = mood repair</i>				
Negative affect	.37	.04	.68	8.43***
Mood repair	-.22	.10	-.18	-2.18*

*Note.** $p < .05$; ** $p < .01$; *** $p < .001$.

6.5.3 Testing the risk-protective model. Centred scores were computed (raw score minus the mean score) and used for the negative affect, emotional attention, emotional clarity and mood repair for all moderation analyses. Using centred scores reduces the problem of multicollinearity of the product terms (Cohen & Cohen, 1983). An interaction term (negative affect \times relevant protective factor) was also created from the centred scores.

To test the risk-protective model, in Step 1 depression was regressed on negative affect and the relevant protective factor in separate analyses. In Step 2, depression was regressed on the negative affect \times the relevant protective factor interaction term. The results are presented in Table 3. As shown, there were no significant predictions by the negative affect \times relevant protective factor interaction terms.

No significant changes in the R^2 value were found between Step 1 and Step 2 in the analyses. However, the Negative Affect \times Emotional Clarity interaction term approached significance ($p = .056$). The findings do not provide support for the risk-protective model in terms of the interaction involving Negative Affect \times Emotional Attention and Negative Affect \times Mood Repair, but provide a trend supporting the risk-protective model for the interaction involving Negative Affect \times Emotional clarity.

Table 3

Results from the Study 1 Regression Analyses for Testing the Risk-Protective Model

	ΔR^2	b	SE	β	t
<i>Protective factor = emotional attention</i>					
Negative affect		.36	.05	.67	8.00***
Emotional attention		.02	.10	.02	0.24
Negative Affect \times Emotional Attention	.00	.00	.01	.03	0.37
$R^2 = .46, F(3, 78) = 21.86$					
<i>Protective factor = emotional clarity</i>					
Negative affect		.32	.04	.60	7.49***
Emotional clarity		-.33	.11	-.25	-3.15**
Negative Affect \times Emotional Clarity	.02	-.02	.01	-.15	-1.94
$R^2 = .54, F(3, 78) = 30.15$					
<i>Protective factor = mood repair</i>					
Negative affect		.37	.04	.68	8.38***
Mood repair		-.22	.10	-.18	-2.17*
Negative Affect \times Mood Repair	.00	.00	.01	-.00	-0.04
$R^2 = .49, F(3, 78) = 24.64$					

Note. b and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

ModGraph-I (Jose, 2013) was used to compute the moderation graph and compute the slope details, see Appendix H4 for analyses. Figure 5 shows the negative affect \times emotional clarity interaction trend effect. For the graph, the effects of negative affect and emotional clarity on depression were plotted at 2 points: high and low. High and low points were $+1SD$ and $-1SD$ of the centred mean respectively.

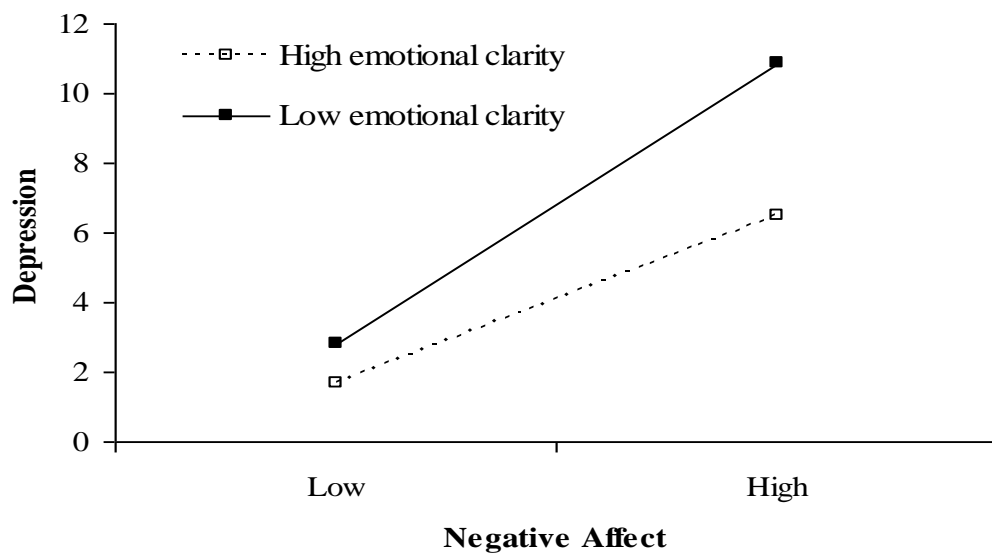


Figure 5. Depression as a function of high and low negative affect, and high and low emotional clarity in Study 1.

The slope for low level of emotional clarity was significant [$b = 0.41$, $t(df = 78) = 9.50$, $p < .001$], while the slope for high level of emotional clarity was also significant [$b = 0.24$, $t(df = 78) = 5.19$, $p < .001$]. As shown in Figure 5, negative affect and depression are more highly correlated at low than at high levels of

emotional clarity, suggesting that higher levels of emotional clarity may reduce the strength of the relationship between negative affect and depression.

6.5.4 Testing the challenge model. The challenge model was tested using a hierarchical regression analysis. In Step 1 depression was regressed on negative affect. In Step 2 depression was regressed on the interaction term of Negative Affect \times Negative Affect. The results are presented in Table 4. As shown, there was a significant prediction by the Negative Affect \times Negative Affect interaction term, indicating support for the challenge model. A significant change in the R^2 value was also found between Step 1 and Step 2.

Table 4

Results from the Study 1 Regression Analyses for Testing the Challenge Model

	ΔR^2	b	SE	β	t
Negative affect		.47	.06	.87	7.91***
Negative affect \times negative affect	.04*	-.01	.00	-.28	-2.56*
$R^2 = .50, F(2, 79) = 39.08^*$					

Note. b and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 6 shows the Negative Affect \times Negative Affect interaction effect. The regression equation used for the graph was derived from an analysis in which depression was regressed negative affect and Negative Affect \times Negative Affect. The regression equation for this prediction was as follows: depression = 6.464 + (0.47 \times Negative Affect) + (-0.008 \times Negative Affect \times Negative Affect). Using this equation, the values for depression for centred negative affect scores ranging from -10 to 35 were compared for the graph (see Appendix H6 for analyses). As shown,

depression increased as negative affect increased at all levels of negative affect. At the highest negative affect scores the associated increase in depression scores reduces and plateaus.

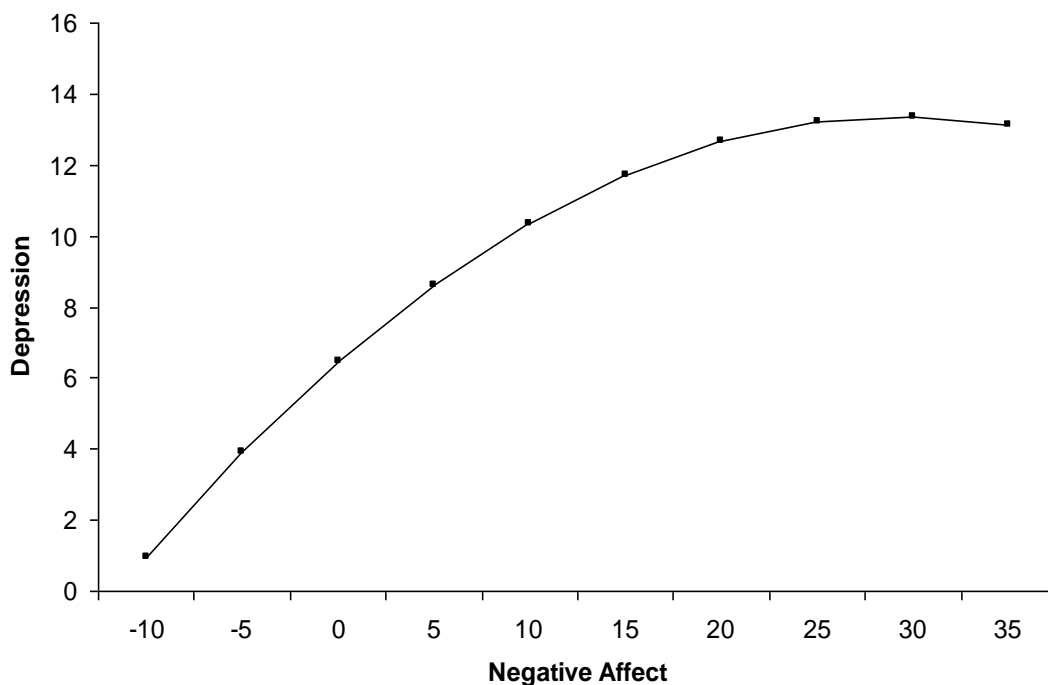


Figure 6. Depression as a function of Negative Affect \times Negative Affect in Study 1.

6.5.5 Testing the protective-protective model. To test the protective-protective model participant's scores on emotional attention, emotional clarity and mood repair were recoded to reflect whether the raw score was above the mean (1) or below the mean (0). Previous analyses showed that emotional attention did not correlate with depression (see Table 1) and there was no evidence to support either the compensatory or risk-protective models for emotional attention. Due to these findings, emotional attention was not used as a protective factor for the analysis of the protective-protective model.

The sample was split into participants with 0, 1 or 2 protective factors. Depression was then regressed onto negative affect for each of the conditions. The

results are presented in Table 5. As shown, the β value decreases from 0 protective factors to 2 protective factors. The small difference in the β value between 0 protective factors and 1 protective factor indicates that there is little difference in protective value between these groups. These results do suggest however that having 2 protective factors is associated with a weakening in the relationship between negative affect and depression. This indicates some support for the protective-protective model.

Table 5

Results from the Study 1 Regression Analyses for Testing the Protective-Protective Model

	<i>b</i>	<i>SE</i>	β	<i>t</i>
<i>0 protective factors</i>				
Negative affect	.51	.10	.71	4.94***
<i>1 protective factor</i>				
Negative affect	.30	.04	.79	6.82***
<i>2 protective factors</i>				
Negative affect	.37	.13	.49	2.79**

Note. *b* and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

6.6 Discussion

The present study investigated the applicability of four models of resilience for the prediction of depression from negative affect and emotional intelligence in children. The results were consistent with existing research (Crook et al., 1998;

Lonigan et al., 2003) which showed that higher levels of negative affect were associated with higher levels of depression symptoms. It was also found that higher levels of emotional clarity and mood repair were associated with lower levels of depression which is consistent with previous research (Rockhill & Greener, 1999). These results indicate that negative affect is a risk factor for depression in children while the emotional intelligence components of emotional clarity and mood repair are protective factors for depression in children.

In relation to the four models of resilience investigated the results of the present study provide partial support for the hypotheses. For the compensatory model it was hypothesised that high level of negative affect would contribute positively, while high level of the different components of emotional intelligence would contribute negatively to the prediction of depression. Significant predictions were found for negative affect, emotional clarity and mood repair, providing support for the compensatory model. This implies that while negative affect, emotional clarity and mood repair will predict depression, negative affect will make an independent positive contribution, while emotional clarity and mood repair make a negative contribution.

It was hypothesised for the risk-protective model that high levels of the different components of emotional intelligence would reduce the strength of the relationship of negative affect with depression. Support was not found for the risk-protective model for mood repair and emotional attention; however there was a strong trend supporting the risk-protective model for the Negative Affect \times Emotional Clarity interaction. Although it did not meet significance, this finding suggests that emotional clarity or the children's perceived ability to distinguish

between emotions may act as a protective buffer on the relationship between negative affect and depression.

For the challenge model it was hypothesised that depression would have a curvilinear relationship with negative affect, such that moderate level of negative affect would have little or no impact on the level of depression, when compared to high and low level of negative affect. There were significant predictions by the negative affect \times negative affect interaction term, providing support for the challenge model. This indicated that depression has a curvilinear relationship with negative affect.

Lastly, for the protective-protective model it was hypothesised that the level of depression would be low for those with high levels of emotional attention, emotional clarity and mood repair compared to those with either high levels of only one or two of the protective factors. Also that the latter group would have lower depression compared to those with no high levels of any of the protective factors. As described previously the present research did not find a correlation between emotional attention and depression and therefore only emotional clarity and mood repair were used as protective factors in the analysis of the protective-protective model. Partial support was found for the protective-protective model indicating that the level of depression will be low for those with both emotional clarity and mood repair, compared to those with only one or no protective factors.

Although there was not full support for each of the models, overall the results of the present study demonstrate negative affect as a risk factor for depression in children and emotional clarity and mood repair as protective qualities of emotional intelligence on depression in children. A possible explanation for this comes from the previous research suggesting that symptoms of depression are associated with

impairments in affect regulation (Garber et al., 1995; Garber, Braafladt, & Zeman, 1991). Depressed children have been found to have particular difficulties in regulating negative affect, employing less effective strategies and having less belief in regulation strategies than non-depressed children. Strategies to self-regulate negative affect are taught within childhood depression interventions such as cognitive behavioural therapy (e.g., Asarnow, Scott, & Mintz, 2002).

In summary, the results indicated that those with higher levels of negative affect were more likely to also have higher levels of depression symptoms, while those with higher levels of emotional clarity and mood repair were more likely to have lower levels of depression. This is consistent with previous research and suggests that negative affect is a risk factor for depression and emotional clarity and mood repair are protective factors for depression.

Overall partial support was found for the four models of resilience investigated. Support was found for the compensatory model, suggesting that negative affect makes a significant independent positive contribution to the prediction of depression, while both emotional clarity and mood repair make significant independent negative contributions to the prediction of depression. A non-significant trend was found for the risk-protective model, suggesting partial evidence that high level of emotional clarity reduces the strength of the relationship between negative affect and depression. Support for the challenge model was found indicating that negative affect has a relationship with depression. Lastly, partial support was found for the protective-protective model indicating lower levels of depression for children with high levels of both emotional clarity and mood repair than those with only one or neither protective factor. Although the models of resilience are not mutually exclusive the present results suggest that the

compensatory model provides a better fit for the protective factors of emotional clarity and mood repair than the risk-protective model does.

6.6.1 Limitations. The findings of the present study should be considered in light of several methodological issues. Difficulties recruiting participants resulted in a smaller sample size than initially proposed; however, power analyses indicated that sufficient power was obtained with the current sample size. The recruitment difficulties also resulted in an overrepresentation of participants from rural schools within lower socioeconomic areas. Even so, the sample contained schools from a variety of socioeconomic areas. Given that socioeconomic status was not measured in Study 1 this presents as a potential confounding variable, given its relation to self-reported depression in children, with children from lower socioeconomic areas reporting higher levels of depression (Kirkwood et al., 2000). There was also a reliance on self-report measures from a single source which may result in findings confounded by common method variance. Reliance on self-report measures also raises the possibility of issues with children not understanding items as a measure of reading ability was not included within the study. However, the researcher was available during the testing if any children were unsure of a test item and each of the questionnaires were selected for their simplicity and as being age appropriate for the sample. A further limitation with the current study was the use of correlation analysis meaning that it is not possible to infer any causal relationships between the variables.

Given the findings of Study 1 showing the association between negative affect and emotional intelligence with depression in children, this relationship will be explored in a clinical population of children post head injury in Chapter 7.

Chapter 7

Study 2: Association of Negative Affect and Emotional Intelligence with Depression among Children following mild Traumatic Brain Injury:

Applicability of resilience models

7.1 Aims and Hypotheses

The aim of Study 2 was to conduct an exploratory analysis of the applicability of the four models of resilience in the prediction of depression from level of negative affect and emotional intelligence among children who had previously sustained a mild TBI. Objective measures of children's emotional ability were included to explore further possible protective factors which could be included within the analysis.

7.1.1 Compensatory model. It was hypothesised that a high level of negative affect would contribute positively (i.e., be associated with higher depression), while high levels of the separate components of emotional intelligence (emotional attention, emotional clarity and mood repair) and measures of emotional ability (emotional awareness and affect recognition) would contribute negatively to the prediction of depression (i.e., be associated with lower depression).

7.1.2 Risk-protective model. It was hypothesised that high levels of the separate components of emotional intelligence (emotional attention, emotional clarity and mood repair) and measures of emotional ability (emotional awareness and affect recognition) would reduce the strength of the relationship of negative affect with depression.

7.1.3 Challenge model. It was hypothesised that depression would have a curvilinear relationship with negative affect, such that moderate levels of negative

affect would have little or no impact on the level of depression, when compared to high and low levels of negative affect.

7.1.4 Protective-protective model. It was hypothesised that the level of depression would be low for those with high levels of emotional attention, emotional clarity, mood repair, emotional awareness and affect recognition compared to those with either a high level of only one, two, three or four of the protective factors and that level of depression would be lowest compared to these groups for those with no high levels of any of the protective factors.

7.2 Method

7.2.1 Participants. A total of 32 children who had previously sustained a mild TBI took part in Study 2 (24 males and 8 females). Participants were recruited from the Royal Hobart Hospital and identified as having sustained a TBI from the relevant hospital ICD diagnostic codes in their hospital record between 2009 and 2012. Examination of their hospital record was used to identify those with a mild TBI only. Approximately 23% of children identified as sustaining a TBI by the Royal Hobart Hospital during this time participated in Study 2. This low participation rate is reflected in part by only those who had been identified as sustaining a mild TBI being invited to participate. Other possible contributors to the low rate include travel and time requirements to participate and the length of time since sustaining the TBI.

Participants ranged in age between 8 and 13 years ($M = 10.72$ years, $SD = 1.97$). The mean age of male participants was 10.67 years ($SD = 2.04$), while the mean age for female participants was 10.88 years ($SD = 1.89$). Males and females did not significantly differ in age, $t(30) = 0.26$, $p = .80$. Participants ranged in time since TBI from 3 months to 33 months ($M = 16.03$, $SD = 8.22$). There was no

significant difference in time since TBI between male and female participants, $t(30) = -1.87, p = .07$. See Appendix I for demographic analyses for Study 2.

7.2.2 Materials.

7.2.2.1 Self-report questionnaires. Three self-report questionnaires were used to collect data for Study 2, including the PANAS-C (Laurent et al., 1999) and the TMMS-C (Rockhill & Greener, 1999) as used in Study 1. In addition, the CDI (Kovacs, 2003) was used to provide a measure of self-report child depression. The CDI replaced the SMFQ used in Study 1 as the CDI provides an overall T -score, taking into account the children's age and gender in comparison to the SMFQ which only provided a raw score. The CDI also provides the potential for further analyses, such as path analyses utilising the five scale scores it also calculates. Please see the Materials section for Study 1 (section 6.2.2) for description of the PANAS-C and TMMS-C.

The CDI is a 27 item scale designed to provide a self-report screening measure of depression symptoms and features associated with depression in children and adolescents aged between 7 and 17 years (Dougherty, Klein, Olino, & Laptook, 2008). The CDI is not based on the formal depression criteria (i.e., *DSM-5*; American Psychiatric Association, 2013) however some of the diagnostic criteria of depression are covered.

Participants were provided with the following instructions:

Kids sometimes have different feelings and ideas. This form lists the feelings and ideas in groups. From each group of three sentences, pick one sentence that describes you best for the past two weeks. After you pick a sentence from the first group, go on to the next group. There is no right or wrong answer. Just pick the sentence that best describes the way you have been

recently. Put a mark like this ☒ next to your answer. Put the mark in the box next to the sentence that you pick.

Participants were then provided with an example before beginning the questionnaire. The three alternative sentences for each item varied in severity, reflecting absence of symptom (scored 0); mild symptom (scored 1); and definite symptom (scored 2) (Rudolph & Lambert, 2007). Approximately half the items have the sentences arranged in order of increasing severity, while the order is reversed for the other half.

The CDI provides a total score comprised of five empirically developed scale totals: negative mood, ineffectiveness, negative self-esteem, interpersonal problems and anhedonia. Raw scores on the completed CDI's for the total score and each of the scale totals were calculated and converted into *T*-scores which can range between 34-100+ and factor in the child's gender and age. Higher *T*-score indicate higher levels of depressive symptoms.

The CDI has good internal consistency with alpha coefficients around 0.80 and many have reported good short-term test-retest reliability (Brooks & Kutcher, 2001; Kovacs, 2003). It also correlates moderately highly with the SMFQ ($r = .67$) as used in Study 1 (Angold et al., 1995).

7.2.2.2 Objective measures of emotional ability. Two objective measures of emotional ability were included in Study 2 to extend the analyses and overcome the reliance on self-report measures.

The Affect Recognition subtest from the NEPSY-II (Korkman, Kirk, & Kemp, 2007) was used to provide a measure of children's facial expression recognition. It has been normed with children aged between 3 – 16 years. With the NEPSY-II Stimulus Book 1 placed on the table in front of the participant they are

asked to recognise facial affect (happy, sad, neutral, fear, angry, disgust) from coloured photos of children's faces. There are four different tasks within this measure which are:

1. Participant is asked to indicate if two photos of faces are displaying the same affect or not.
2. Participant is asked to select two photos of faces which display the same affect from a series of three or four photos.
3. Participant is asked to select one photo of a face from a series of four photos which displays the same affect as a target face shown above.
4. Participant is briefly shown the photo of a face and then from memory is asked to select two photos of faces from a series which display the same affect as the previous face.

For items when only one response is required the participants was scored 1 for a correct response and a 0 for an incorrect response. For items where participants are asked to provide two responses the participant is scored 1 if both responses are correct and 0 if only one or neither were correct. A total score was obtained by summing item scores which was then converted into a scaled score. Scaled scores have a mean of 10 and a standard deviation of 3. Higher scores indicated better facial expression recognition.

The Affect Recognition subtest has good internal reliability of over .80 for 7 – 10 year olds (Brooks, Sherman, & Strauss, 2010). Test-retest reliability lies between .52 and .58 for children between the ages of 9 to 16 years.

The Levels of Emotional Awareness Scale for Children (LEAS-C); Bajgar, Ciarrochi, Lane, & Deane, 2005) is a child version of the adult assessment the Levels of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, & Zeitlin,

1990). It is a self-report performance measure of the complexity of children's awareness of emotions.

For the LEAS-C participants were verbally presented with a series of 12 scenarios featuring oneself and another person (i.e., mother or friend) and were asked to describe how they might feel and how the other person might feel in each situation. Situations were based around one of the following emotions: anger, fear, happiness or sadness. Participants' responses were recorded verbatim to control for variations in writing ability.

For each scenario participants responses were scored on the basis of the structural complexity of their response. Responses were scored on a 5-point scale (0-5) where level 0 refers to low complexity of emotional awareness (i.e., no response or description of a cognitive state) and level 4 refers to high complexity of emotional guidelines obtained from the LEAS-C manual (Bajgar & Lane, 2004) were followed, supplementing scoring guidelines from the LEAS (Lane et al., 1990). Three separate ratings were made for each scenario. Self-awareness: rating of the complexity of the emotional response the participant indicated they might feel in the scenario. Other-awareness: rating of the complexity of the emotional response made by the participant of how the other person referred to in the scenario might feel. Total-awareness: a total score was created which was the highest rating out of the self and other scores for each scenario. In the case that both of the scores for a scenario were level 4 and the responses were clearly different from each other the participant's total score was level 5.

Adequate internal consistency had been reported of .71 for self-awareness, although slightly lower for other-awareness at .64 and .66 for total-awareness (Bajgar et al., 2005). Significant gender effects have also been reported in children aged 9-

13 with females achieving significantly higher scores compared to males (Bajgar, Deane, & Lane as cited by Bajgar & Lane, 2004). Further research has found that depression as measured by the CDI had a significant negative correlation in males with the LEAS-C of $-.17$. There was no significant correlation between the CDI and the LEAS-C for females.

7.2.2.3 Control measures. The Vocabulary subtest of the Wechsler Intelligence Scale for Children – Fourth Edition Australian Standardised Edition (WISC-IV Australian; Wechsler, 2005) was used to provide a measure of participants' verbal skills. The Vocabulary subtest was administered and scored according to the standardised guidelines in the Australian WISC-IV Administration and Scoring Manual (Wechsler, 2005). Participants were orally and visually presented a series of words and asked to provide the definition of each word. Responses were recorded verbatim and scored 0, 1 or 2 according to the manual guidelines. Raw scores for items were added up and the total raw score was converted into a scaled score.

The Vocabulary subtest was included in Study 2 as a control measure as the Vocabulary subtest from the WISC-III was found to have a significant moderate correlation with the LEAS-C total-awareness score (Bajgar et al., 2005). This suggests that children's verbal skills relate to their emotional skills. Although children's total-awareness LEAS-C score correlated with verbal skills, no relationship was found between Vocabulary and either the children's self-awareness or other-awareness scales.

Lastly, parents were asked to complete the Australian Socioeconomic Index 2006 (AUSEI06; McMillan, Beavis, & Jones, 2009). The AUSEI06 was used to provide ratings of socioeconomic status (SES) based on parents'/guardians'

occupations. It is a continuous scale that is used to convert occupational scores obtained from the Australian and New Zealand Standard of Classification of Occupations (ANZSCO; Australian Bureau of Statistics, 2007). It provides a score ranging from 0 (low status) to 100 (high status).

Both parents/guardians were asked to provide their current occupations of both the child's parents. Researchers coded each parent's occupation using the ANZSCO then converted this code into a score according to the AUSEI06 scale. If more than one parent was currently employed the higher score of the two was used as an indicator of SES.

7.3 Procedure

Study 2 received ethical approval from the Tasmanian Health & Medical Human Research Ethics Committee (approval number: H0011378; see Appendix J). Ethical approval and data collection for Study 2 were undertaken in conjunction with Study 3.

Lists of children who had presented to the Royal Hobart Hospital and had received a universally employed ICD diagnostic code indicating they had sustained a TBI between 2009 and 2012 were provided by the Clinical Classification and Information Service of the Royal Hobart Hospital. Researchers reviewed electronic medical files of potential participants to assess suitability for participation including determining if they had sustained a mild TBI, as identify by either LOC <30 minutes, a GCS score of 13 to 15 and/or PTA <1 hour. The reviewed medical files also provided details regarding potential exclusion criteria which were the presence of an existing neurological disorder (e.g., Epilepsy or Autism), sustaining more than one significant TBI or if their first language wasn't English.

Parents/guardians of potential participants were contacted by provisional psychologists on behalf of Royal Hobart Hospital Clinical Neuropsychologist and asked if they would allow researchers to contact them regarding participating in the study. Those parents/guardians who provided consent were contacted by either one of the researchers or provisional psychologists assisting with data collection. The researcher explained the aims of the study and determined if they were willing to participate. Exclusion criteria (as detailed in the previous paragraph) were also discussed to check they were able to be included. The researcher arranged a suitable time for the child participant and parent/guardian to attend either the Royal Hobart Hospital or the Psychology Research Centre at the University of Tasmania. Parents/guardians were posted confirmation of the appointment time, map and a parking permit (for those coming to the University of Tasmania).

Upon arrival at the assessment session parents/guardians were provided with a plain language information sheet which the researcher discussed with them and any questions were answered (see Appendix K for parent information sheet and consent forms). Parents/guardians were then provided with a consent form to sign and provided with the option to receive brief feedback regarding the child's performance following the assessment. Children aged 12 and over were provided with an age appropriate information sheet and consent form (see Appendix L). Children under the age of 12 were asked to provide informal consent. Following written consent being obtained parents/guardians were directed to an area outside of the test room and provided with a series of questionnaires to complete.

Children were administered the assessment battery by the researcher and offered breaks as needed. On conclusion of the battery, parents/guardians decision to

receive feedback was confirmed and following scoring the measures the researchers provided brief feedback over the phone within 2-3 weeks.

Each child was allocated a number which was written on each of their protocols and forms to ensure confidentiality. This number was then used for electronic data files to de-identify information. Data was able to be re-identified to allow brief feedback to be provided to parents. Being able to re-identify the data also allows for access to the measures of the child's cognitive, social and emotional functioning should these results be helpful for a future health issue.

7.4 Data Analysis

The compensatory, risk-protective, challenge and protective-protective models were tested using the multiple regression methods as detailed in Study 1 and proposed by Garnezy et al. (1984). All models were tested in separate analyses. Due to the limited number of participants the total *T*-score for depression from the CDI was used as the outcome measure in the regression analyses rather than analysing each of the five scale scores. As with Study 1 the three emotional intelligence protective factors of emotional attention, emotional clarity and mood repair were analysed separately.

The compensatory model was tested by regressing the outcome factor (depression) on the risk factor (negative affect) and the relevant protective factor (emotional attention, emotional clarity and mood repair) in separate analyses. Support for the compensatory model would be indicated by significant prediction by both the risk factor (negative affect) and the relevant protective factor (emotional attention, emotional clarity and mood repair).

The risk-protective model was tested by performing hierarchical regression analyses where in Step 1 the outcome factor (depression) was regressed on the risk

factor (negative affect) and the relevant protective factor (emotional attention, emotional clarity and mood repair) in separate analyses. In Step 2 the outcome factor (depression) was regressed on the interaction term of the risk factor (negative affect) \times the relevant protective factor (emotional attention, emotional clarity and mood repair). Support for the risk-protective model would be indicated by significant prediction by the interaction term. Support would also be found in a significant change in the R^2 values between Step 1 and Step 2.

The challenge model was tested by performing a hierarchical regression analysis where in Step 1 the outcome factor (depression) was regressed on the risk factor (negative affect). In Step 2 the outcome factor (depression) was regressed on the risk factor interaction term (Negative Affect \times Negative Affect). Support for the challenge model would be indicated by significant prediction by the interaction term.

For the protective-protective model participants' scores on each of the three protective factors were recoded to reflect if they were above the mean (1) or below the mean (0). The sample was then split into those with 0, 1, 2 or 3 protective factors. Separate analyses were performed where the outcome factor (depression) was regressed on the risk factor (negative affect) for each level of protective factor. Support for the protective-protective model would be indicated by a reduction in the beta values as the number of protective factors increases.

Data for the 32 children who participated in Study 2 is provided in Appendix M. A power analysis conducted indicated that with two predictors at least 59 participants were required to obtain a power of .80. Therefore due to the recruitment difficulties the current sample lacked adequate power.

7.5 Results

Unless otherwise stated all statistical analyses were performed using SPSS version 21 for windows with an alpha level of .05. Output from SPSS analyses for Study 2 is provided in Appendix N.

7.5.1 Descriptive scores and correlations between measures. Table 6 presents the means and standard deviations as well as the correlations between Study 2 measures. As shown, the correlation between depression and negative affect was positive and highly significant ($p < .001$). Also shown are the significant negative correlations between depression and both emotional clarity and mood repair. These indicate that high levels of depression are associated with high levels of negative affect while low levels of depression are associated with high levels of emotional clarity and mood repair. Emotional attention had a negligible correlation with depression.

In relation to the objective measures of emotional ability Table 6 shows that none of self-awareness, other-awareness, and total-awareness correlated significantly with depression. Affect recognition was also found not to correlate with depression. The lack of association with the outcome factor of depression indicates that these factors are not protective factors and were therefore not included within the examination of the resilience models.

Analysis of the control measures found vocabulary had a significant, moderate correlation with other-awareness (.39) and total-awareness (.40) from the LEAS-C. There was a moderate, negative correlation between SES and depression which approached significance ($p = .052$). SES only correlated significantly with vocabulary ($p = .005$) with a large effect size.

Negligible correlations were found between study measures and both participants age at the time of the assessment in years, and the time since TBI in months.

Table 6

Descriptive Statistics and Correlations for Study 2 Measures

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Correlations</i>														
1. Depression	-	.66***	.06	-.38*	-.45**	-.47**	.09	.05	.06	-.33	.08	-.35	-.19	.00
2. Negative affect		-	.09	-.27	-.08	-.33	-.27	-.21	-.17	-.36*	-.27	-.17	-.18	.12
3. Emotional attention			-	.02	.24	.09	.38*	.28	.32	-.21	.06	-.13	.06	-.17
4. Emotional clarity				-	.31	.69***	.12	.31	.13	.12	.19	-.04	-.21	-.09
5. Mood repair					-	.73***	.15	.15	.19	.04	-.20	.21	.09	.07
6. Protective factors						-	.25	.25	.22	.18	-.05	.25	.01	.19
7. Self-awareness ^a							-	.65**	.85**	.23	.30	-.22	.03	.10
8. Other-awareness ^a								-	.75**	.39*	.26	-.17	.17	.05
9. Total-awareness ^a									-	.40*	.28	-.02	.24	.05
10. Vocabulary										-	.03	.50**	.21	-.02
11. Affect recognition											-	-.21	.11	-.22
12. SES ^b												-	.16	-.18
13. Age													-	-.01
14. Time since injury														-
Mean	47.25	27.06	22.06	18.59	13.44	1.19	30.86	30.34	33.90	9.81	9.94	56.97	10.72	16.03
Standard deviation	11.24	11.20	3.72	3.66	3.94	0.78	4.88	4.17	4.14	2.61	2.21	24.89	1.97	8.22

Note. $N = 32$. ^a $N = 29$. ^b $N = 31$. SES = Socioeconomic status. Age = Age at assessment in years. Time since injury = Time since TBI in months

* $p < .05$; ** $p < .01$; *** $p < .001$.

Significance testing between Study 1 and Study 2 correlations was conducted with Simple Interactive Statistical Analysis (SISA; Uitenbroek, 1997). No significant differences (i.e., all significance values were $p > .05$) were found between the correlations involving negative affect, emotional attention, emotional clarity, mood repair and depression (see Appendix N2 for analyses). This indicates that the Study 1 and Study 2 results were consistent. Comparison of means between Study 1 and Study 2 was also conducted using SISA (see Appendix N3 for analyses). As shown in Table 7 there were no significant differences found between the means for negative affect, emotional attention, emotional clarity and mood repair between the studies. Depression was unable to be compared as a different measure was used in Study 2 than in Study 1.

Table 7

The t values and Significance Levels for Differences between Study 1 and Study 2

Means

	<i>t</i> -test for equality of means	
	<i>t</i>	<i>p</i>
<i>Measures (df)</i>		
Negative affect (50.6)	-0.25	.40
Emotional attention (70.9)	0.64	.74
Emotional clarity (62.4)	-1.13	.13
Mood repair (60.4)	0.90	.86

Table 8 presents the correlations between scale scores from the CDI. As shown, there were large effect sizes between most subscales and each of the five scale totals significantly correlated with the total score. Given the small number of

participants for the current study the total score obtained from the CDI was used as the measure of depression for all Study 2 analyses.

Table 8

Correlations for Children's Depression Inventory Scales

	1	2	3	4	5	6
<i>Correlations</i>						
1. Total score	-	.92***	.79***	.78***	.87***	.91***
2. Negative mood		-	.64***	.65***	.77***	.78***
3. Interpersonal problems			-	.61***	.60***	.68***
4. Ineffectiveness				-	.49**	.73***
5. Anhedonia					-	.73***
6. Negative Self-Esteem						-

Note. $N = 32$.

* $p < .05$; ** $p < .01$; *** $p < .001$.

7.5.2 Testing the compensatory model. To test the compensatory model depression was regressed on negative affect and each of the protective factors in separate analyses. Table 9 presents the results. As shown, for emotional attention and emotional clarity there was a significant prediction by negative affect; however, neither emotional attention nor emotional clarity were significant. This does not provide support for the compensatory model.

Table 9 also shows that for mood repair, there were significant predictions by negative affect and mood repair. The significant findings for mood repair provide support for the compensatory model.

Table 9

Results from the Study 2 Regression Analyses for Testing the Compensatory Model

	<i>b</i>	<i>SE</i>	β	<i>t</i>
<i>Protective factor = emotional attention</i>				
Negative affect	0.67	.14	.66	8.13***
Emotional attention	0.02	.42	.01	0.21
<i>Protective factor = emotional clarity</i>				
Negative affect	0.61	.14	.61	4.37***
Emotional clarity	-0.67	.43	-.22	-1.56
<i>Protective factor = mood repair</i>				
Negative affect	0.63	.12	.63	5.37***
Mood repair	-1.14	.34	-.40	-3.41**

*Note.** $p < .05$; ** $p < .01$; *** $p < .001$.

7.5.3 Testing the risk-protective model. As with Study 1, centred scores were computed (raw score minus the mean score) and used for the negative affect, emotional attention, emotional clarity and mood repair for all moderation analyses. An interaction term (negative affect \times relevant protective factor) was also created from the centred scores.

To test the risk-protective model in Step 1, depression was regressed on negative affect and the relevant protective factor in separate analyses. In Step 2, depression was regressed on the negative affect \times the relevant protective factor interaction term. The results are presented in Table 10. As shown, there were no significant predictions by the Negative Affect \times Emotional Attention or Negative Affect \times Emotional Clarity interaction terms. No significant changes in the R^2 value were found between Step 1 and Step 2 in the analyses for emotional attention and

emotional clarity indicating that these do not provide support for the risk-protective model. In contrast a significant prediction was made by the Negative Affect \times Mood Repair interaction term along with a significant change in the R^2 value. These findings provide support for the risk-protective model for the Negative Affect \times Mood Repair interaction.

Table 10

Results from the Study 2 Regression Analyses for Testing the Risk-Protective Model

	ΔR^2	b	SE	β	t
<i>Protective factor = emotional attention</i>					
Negative affect		.66	.14	.66	4.61***
Emotional attention		.07	.44	.02	0.15
Negative Affect \times Emotional Attention	.00	.02	.04	.06	0.40
$R^2 = .45, F(3, 28) = 7.47$					
<i>Protective factor = emotional clarity</i>					
Negative affect		.59	.14	.59	4.24***
Emotional clarity		-.65	.42	-.21	-1.54
Negative Affect \times Emotional Clarity	.02	-.05	.05	-.14	-1.06
$R^2 = .51, F(3, 28) = 9.51$					
<i>Protective factor = mood repair</i>					
Negative affect		.67	.10	.67	6.62***
Mood repair		-.85	.30	-.30	-2.86**
Negative Affect \times Mood Repair	.12**	-.10	.03	-.36	-3.46**
$R^2 = .72, F(3, 28) = 24.06**$					

Note. b and β are unstandardised and standardised beta coefficients respectively, from step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

ModGraph-I (Jose, 2013) was used to compute the moderation graph and compute the slope details, see Appendix N6 for analyses. Figure 7 shows the Negative Affect \times Mood Repair interaction effect. The effects of negative affect and mood repair on depression were plotted at 2 points: high and low. High and low points were $+1SD$ and $-1SD$ of the centred mean respectively.

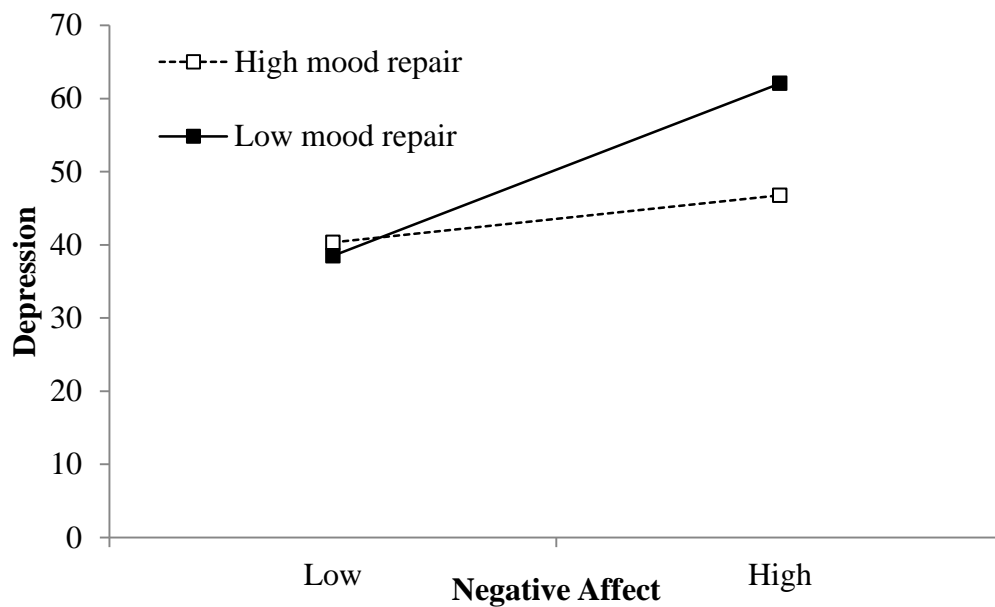


Figure 7. Depression as a function of high and low negative affect, and high and low mood repair in Study 2.

Analysis demonstrated that the slope for low level of mood repair was significant [$b = 1.05$, $t(df = 28) = 6.58$, $p < .001$]; however the slope for high level of mood repair was not significant [$b = 0.29$, $t(df = 28) = 1.80$, $p = .08$]. As demonstrated in Figure 7, the rate of increase in depression as a function of negative affect is much greater for low mood repair in comparison to high levels of mood repair.

7.5.4 Testing the challenge model. The challenge model was tested using a hierarchical regression analysis. In Step 1 depression was regressed on negative affect. In Step 2 depression was regressed on the interaction term of Negative Affect \times Negative Affect. The results are presented in Table 11. As shown, the Negative Affect \times Negative Affect interaction term was not significant and there were no significant changes in the R^2 value between Step 1 and Step 2. However, the interaction term approached significance ($p = .088$) indicating a trend supporting the challenge model.

Table 11

Results from the Study 2 Regression Analyses for Testing the Challenge Model

	ΔR^2	b	SE	β	t
Negative affect		.91	.19	.90	4.78***
Negative affect \times negative affect	.05	-.02	.01	-.33	-1.77
$R^2 = .50, F(2, 29) = 14.25$					

Note. b and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 8 shows the Negative Affect \times Negative Affect interaction effect. As in Study 1 the regression equation used for the graph was derived from the analysis in which depression was regressed on negative affect and Negative Affect \times Negative Affect. The regression equation for this prediction was as follows:

$$\text{depression} = 50.10 + (0.91 \times \text{Negative Affect}) + (-0.02 \times \text{Negative Affect} \times \text{Negative Affect}).$$
Using this equation, the values for depression for centred negative affect scores ranging from -15 to 35 were compared for the graph (see Appendix N8 for analyses). As shown, depression increased as negative affect increased at nearly all

levels of negative affect. At the highest negative affect scores the associated increase in depression scores reduces and levels.

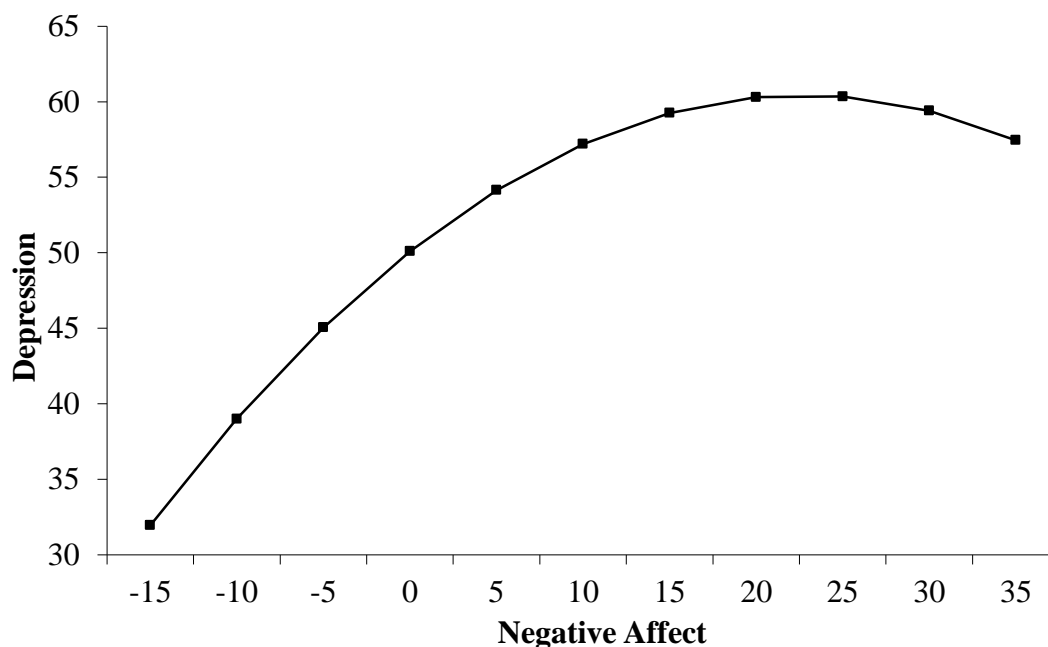


Figure 8. Depression as a function of Negative Affect \times Negative Affect in Study 2.

7.5.5 Testing the protective-protective model. To test the protective-protective model participant's scores on emotional attention, emotional clarity and mood repair were recoded to reflect whether the raw score was above the mean (1) or below the mean (0). Previous analyses showed that as with Study 1 emotional attention did not correlate with depression. Due to these findings, emotional attention was not used as a protective factor for the analysis of the protective-protective model for Study 2.

The sample was split into participants with 0, 1 or 2 protective factors. Depression was then regressed onto negative affect for each of the conditions. The results are presented in Table 12. As shown, the β value decreases from 0 protective

factors to 1 protective factor indicating some protective value between these groups. However, the β values for 0 protective factors and 2 protective factors are equal suggesting that there is little difference in the protective value of 2 protective factors compared to no protective factors. Further the increase in β values from 1 protective factor to 2 protective factors indicates that 1 protective factor is more beneficial than 0 or 2 at weakening the relationship between negative affect and depression. This provides partial support for the protective-protective model.

Table 12

Results from the Study 2 Regression Analyses for Testing the Protective-Protective Model

	<i>b</i>	<i>SE</i>	β	<i>t</i>
<i>0 protective factors</i>				
Negative affect	1.05	.43	.74	2.45
<i>1 protective factor</i>				
Negative affect	0.52	.22	.60	2.39*
<i>2 protective factors</i>				
Negative affect	0.38	.11	.74	3.60**

Note. *b* and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

7.6 Discussion

Study 2 explored the applicability of the four models of resilience for the prediction of depression from negative affect and emotional intelligence in children following a mild TBI. It was found that higher levels of negative affect were

associated with higher levels of depression symptoms which are consistent with Study 1 and existing research with non TBI samples (Crook et al., 1998; Lonigan et al., 2003). Higher levels of emotional clarity and mood repair were associated with lower levels of depression symptoms, also consistent with Study 1 and existing research (Rockhill & Greener, 1999). As in Study 1, emotional attention was not found to associate with depression. These results suggest that negative affect is a risk factor for depression while emotional clarity and mood repair act as protective factors for depression in children post mild TBI.

It was hypothesised for the compensatory model that a high level of negative affect would contribute positively, while high level of the different components of emotional intelligence would contribute in a negative direction to the prediction of depression. Negative affect and mood repair was found to significantly predict depression, providing support for the compensatory model. This finding suggests that negative affect makes an independent positive contribution to the prediction of depression while mood repair makes an independent negative contribution to the prediction of depression.

For the risk-protective model it was hypothesised that high levels of the different components of emotional intelligence would reduce the strength of the relationship of negative affect with depression. There was no support found for the risk-protective model for the emotional intelligence components of mood repair and emotional attention. There was a significant prediction made by the Negative Affect \times Mood Repair interaction and significant changes in the R^2 value were also found. These results indicated support for the risk-protective model in relation to mood repair as the protective factor. It suggests that the level of depression is the product

of the interaction between mood repair and negative affect. This indicates that mood repair functions as a protective buffer on the effect of negative affect on depression.

It was hypothesised for the challenge model that depression would have a curvilinear relationship with negative affect; that is, moderate level of negative affect would have little or no impact on the level of depression when compared to high and low level of negative affect. A non-significant trend, providing partial support for the challenge model was found as the prediction by the interaction term approached significance.

Lastly, for the protective-protective model it was hypothesised that the level of depression would be low for those with high level of emotional attention, emotional clarity and mood repair compared to those with either high level of only one or two of the protective factors, and that the latter group would have lower depression compared to those with no high level of any of the protective factors. As in Study 1, the present study did not find a significant correlation between emotional attention and depression and therefore only emotional clarity and mood repair were used as protective factors in the current analysis. Partial support was found for the protective-protective model. The results showed some benefit of 1 protective factor at weakening the relationship between negative affect and depression compared to no protective factors; however, 2 protective factors were found to have little difference in protective value than no protective factors. This may reflect the small sample with only 7 of the 32 children classified as having 0 protective factors and that although there was some benefit of 1 protective factor found, it was only a small benefit.

In comparison to Study 1, the means for negative affect, emotional attention, emotional clarity and mood repair were found to be equivalent, indicating that there were no significant differences on these measures between the two samples.

Analysis of the correlations between depression, negative affect, emotional attention, emotional clarity and mood repair found in Studies 1 and 2 found that these were consistent.

The results from Study 2 indicate that in children post mild TBI negative affect is a risk factor for depression symptoms while emotional clarity and mood repair are protective factors. Overall, the hypotheses were partially supported with negative affect and mood repair providing support for the compensatory model and the risk-protective model; while partial support was found for the challenge model and the protective-protective model.

Previous research suggests that children post-TBI can experience emotion regulation difficulties (Ganesalingam et al., 2006). Emotion regulation is similar to the investigated concept of mood repair which measures the child's belief in their ability to regulate their moods and emotions. The current study showed that mood repair can act as an independent negative predictor of depression symptoms as well as can act as a buffer on the relationship between the risk factor of negative affect and depression. This suggests that a child's belief in their ability to manage their mood is an important consideration in post-TBI intervention programs.

Negligible correlations were found between depression and the objective measures obtained from the LEAS-C of self-awareness, other-awareness and total-awareness. Significant, weak correlations have previously been reported between self-reports of depression and total-awareness for male children; however consistent with the current study was the non-significant correlation found in the female sample. Affect recognition was also not found to correlate significantly with depression. As no significant relationship was found between measures from the

LEAS-C and affect recognition with the outcome factor of depression being investigated these measures were not used in the analyses of resilience models.

Vocabulary showed a significant, moderate correlation with other-awareness and total-awareness which is similar to previous research (Bajgar et al., 2005) which found vocabulary correlated with total-awareness but neither the subscales of self-awareness or other-awareness. Vocabulary also had a significant, large correlation with SES, suggesting higher SES related to higher vocabulary skills. SES did not significantly correlate with any other variables analysed. A moderate, negative correlation was found between SES and depression however this was not significant. This finding is similar to previous research which has found SES to significantly influence children's self-reported depression symptoms (Kirkwood et al., 2000). Although the finding in the current study was not significant the direction of the relationship is consistent, suggesting that lower SES is associated with higher levels of depression symptoms.

In summary, the results of Study 2 suggested that children post mild TBI with high levels of negative affect were more likely to also have high levels of depression symptoms, while those with high levels of emotional clarity and mood repair were more likely to have low levels of depression. This is consistent with previous research and the findings in Study 1, suggesting that negative affect is a risk factor for depression and emotional clarity and mood repair are protective factors for depression in children post mild TBI. The findings from Study 2 have contributed to the current knowledge as to date resilience models predicting depression from negative affect and emotional intelligence have not been investigated in children post mild TBI.

Support was found for the compensatory model, suggesting that negative affect makes an independent positive contribution to the prediction of depression, while mood repair makes an independent negative contribution. Support was also found for the risk-protective model, indicating that high level of mood repair reduces the strength of the relationship between negative affect and depression. Partial support for the challenge model was found suggesting a curvilinear relationship between negative affect and depression. Lastly, partial support was found for the protective-protective model indicating lower levels of depression for children with high level of 1 protective factor than those with no protective factors or those with high level of 2 protective factors. In conclusion, for Study 2 the greatest support was found for the compensatory model with both emotional clarity and mood repair being found to make independent negative contributions to the prediction of depression.

7.6.1 Limitations. The findings of Study 2 should be considered in the light of several methodological issues. Only 23% of those children identified as potential participants from the Royal Hobart Hospital consented to participate in the current study. This difficulty in recruitment resulted in a much smaller sample size than initially proposed and as such limited the possible analyses conducted, such as path analyses utilising scale scores from the CDI. The small sample size also resulted in lower power in the analyses and likely contributed to finding less support for the models. The low participation rate also reduces the ability to generalise these findings as the sample may not be representative of the population.

A further limitation was the large gender differences within the sample, although the higher rate of males than females reflects TBI incident rates (Fortune & Wen, 1999). Given potential gender differences in outcomes post-TBI this is something to consider for future research (Hirschberg, Weiss, & Zafonte, 2008).

In an attempt to overcome the reliance on self-report measures used in Study 1 which may result in findings confounded by common method variance, objective measures were included in the current study. Affect recognition and the measures provided by the LEAS-C however were not then included within the analyses of resilience models as correlations suggested that they were not protective factors related to the outcome factor of depression being explored.

Due to the design and time-frame of the research, there was a range of 3 to 33 months in participants being assessed post-TBI. Although as shown in Table 6, time since injury had negligible correlations with all other study measures, the variation in time since injury influenced the decision to not include a measure of pre-morbid depression symptoms in the assessment. This also reflects the focus of the current study on the relationships between protective and risk factors in children post-TBI rather than investigating specifically novel episodes of depression following TBI. The large variation in time since injury should further be acknowledged for its potential influence on the findings as there would have been large variations in children's stage of recovery.

Study 2 provided insight into the relationships between protective and risk factors of emotional intelligence and negative affect with depression in a clinical sample of children following mild TBI. Study 3 will detail an explorative investigation into the relationship between parent reports of lability/negativity and emotion regulation with depression in children post-TBI.

Chapter 8

Study 3: Exploratory study of the Association of Parent-Rated Lability/Negativity and Emotion Regulation with Depression in Children Following Mild Traumatic Brain Injury: Applicability of Resilience Models

8.1 Aims and Hypotheses

The aim of Study 3 was to conduct an exploratory study of the applicability of the four models of resilience in the prediction of depression from levels of lability/negativity and emotion regulation among children who had previously sustained a mild TBI with parent rated measures.

8.1.1 Compensatory model. It was hypothesised that high levels of lability/negativity would contribute positively; while high levels of emotion regulation would contribute negatively to the prediction of depression.

8.1.2 Risk-protective model. It was hypothesised that high levels of emotion regulation would reduce the strength of the relationship of lability/negativity with depression.

8.1.3 Challenge model. It was hypothesised that depression would have a curvilinear relationship with lability/negativity, such that moderate levels of lability/negativity would have little or no impact on the level of depression when compared to high and low levels of lability/negativity.

8.1.4 Protective-protective model. It was hypothesised that the level of depression would be low for those with high levels of emotion regulation compared to those with low levels of emotion regulation.

8.2 Method

8.2.1 Participants. A total of 31 parents of children who had previously sustained a mild TBI took part in Study 3. One parent whose child participated in

Study 2 requested to complete the questionnaires at home due to visual difficulties, but never returned these. Parents were recruited from the Royal Hobart Hospital and identified as having a child between 8 and 13 years of age who sustained a TBI from the relevant diagnoses codes in their hospital record between 2009 and 2012.

Approximately 23% of parents contacted participated in Study 3.

8.2.2 Materials. Three questionnaires were used to collect data for Study 3, the AUSEI06 (McMillan et al., 2009), the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997), and the Children's Depression Inventory: Parent Version (CDI:P; Kovacs, 2003).

Parents were asked to complete the AUSEI06 as it was used to provide a rating of the family's SES based on the parents'/guardians' occupations. Please refer to Study 2 (section 7.2.2.3) for details regarding the AUSEI06 and administration of parent questionnaires.

The ERC is a 24-item adult report measure of children's usual methods of managing emotional expression and experiences (Shields & Cicchetti, 1997). It consists of two scales, lability/negativity and emotion regulation. The lability/negativity scale is comprised of 15 items which measure frequency of such aspects as dysregulation, displays of anger and impulsivity. Items include: "Exhibits wild mood swings" and "Displays negative emotions when attempting to engage others in play". The emotion regulation scale is comprised of 8 items and measures the frequency of such aspects as emotion expression, emotional understanding, empathy and the child's ability to manage their emotions. Items include: "Displays appropriate negative emotions" and "Can say when s/he is feeling sad, angry or mad, fearful or afraid".

Each item on the ERC was rated by parents/guardians according to a 4-point Likert-type scale indicating the frequency of which the child exhibits the behaviours. The scale choices were *rarely/never* (rated 1); *sometimes* (rated 2); *often* (rated 3); and *almost always* (rated 4). The ERC was scored according to Shields and Cicchetti (1997) with both positively and negatively weighted items. Raw scores for the lability/negativity scale ranged between 14 and 37 with higher scores indicating greater dysregulation. Emotion regulation raw scores ranged between 21 and 33 with higher scores indicating greater emotional regulation skills.

The ERC has shown good internal consistency with a coefficient alpha for the lability/negativity scale of .96 (Shields & Cicchetti, 1997). The emotion regulation scale was found to have a coefficient alpha of .83.

The CDI-P is a 17-item scale designed to provide a parent report of depression symptoms and features associated with depression in children and adolescents aged 7 – 17. It provides a total score which is comprised of two subscales: emotional and functional. All 17 items contributed to the total score while the emotional scale consisted of 9 items (e.g., “My child looks sad”) and the functional scale consisted of 6 items (e.g., “My child spends time with friends”).

Parents/guardians were asked to rate each of the items on a 4-point Likert-type scale as to the frequency they had observed their child displaying the described behaviours over the past two weeks. The scale choices were *not at all* (rated 0); *some of the time* (rated 1); *often* (rated 2); and *much or most of the times* (rated 3). Raw scores on the completed CDI-P’s were calculated and converted into *T*-scores which can range between 33 and 100+ and factor in the child’s gender and age. Higher *T*-scores indicate higher levels of child’s depressive symptoms as rated by

their parent. The CDI manual (Kovacs, 2003) reports satisfactory consistency between ratings on the child and parent versions ($r = .41$).

8.3 Procedure

Study 3 received ethical approval in conjunction with Study 2 from the Tasmanian Health & Medical Human Research Ethics Committee (approval number: H0011378; see Appendix J). For detail of the procedure please see Chapter 7, section 7.3.

8.4 Data Analysis

The compensatory, risk-protective, challenge and protective-protective models were tested using the multiple regression methods as described in Study 1 and 2 (Garmezy et al., 1984). All models were tested in separate analyses.

Data for the 31 parents who participated in Study 3 is provided in Appendix M. To obtain adequate power of .80 for the current analysis, a power analysis conducted indicated that for two predictors at least 59 participants were required. As with Study 2, the current sample in Study 3 is below this and therefore has low power.

8.5 Results

Unless otherwise stated all statistical analyses were performed using SPSS version 21 for windows with an alpha level of .05. Output from SPSS analyses for Study 3 is provided in Appendices N1 and O.

8.5.1 Descriptive scores and correlations between measures. Table 13 presents the means, standard deviations and intercorrelations for all Study 3 measures. As shown, there was a significant and positive correlation between parents' ratings of children's depression symptoms and ratings of lability/negativity. This suggests that higher ratings of depression were associated with higher ratings of

lability/negativity. Parents' ratings of depression were also significantly negatively related to their ratings of children's emotion regulation. These results indicate that lower ratings of depression were associated with higher ratings of emotion regulation skills.

Moderate effect sized negative correlations were found between SES and parent rated child depression and lability/negativity. A large, positive correlation was found between SES and emotion regulation.

Table 13

Descriptive Statistics and Correlations for all Study 3 Measures

	1	2	3	4	5
<i>Correlations</i>					
1. Depression ^a	-	.59**	-.51**	-.33	-.39*
2. Lability/negativity		-	-.58**	-.23	-.45*
3. Emotion regulation			-	.20	.64***
4. Number of protective factors				-	.44*
5. SES					-
Mean	45.44	24.45	28.32	1.19	56.97
Standard deviation	7.59	6.80	3.24	0.78	24.89

Note. $N = 31$. ^a $N = 27$. SES = Socioeconomic status.

* $p < .05$; ** $p < .01$; *** $p < .001$.

As shown in Table 14, the parent rated total depression scaled score strongly correlated with each of the CDI-P subscales. Given this the total score obtained from the CDI-P was used as the measure of depression for all Study 3 analyses. A moderate correlation was found between the total scores on the child and parent versions which is consistent with previous research (Kovacs, 2003).

Table 14

Correlations for Children's Depression Inventory Total Score and Children's Depression Inventory – Parent Version Scales

	1	2	3	4
<i>Correlations</i>				
1. Child rated total depression	-	.44*	.37	.39*
2. Parent rated total depression		-	.89***	.68***
3. Parent rated emotional problems			-	.36
4. Parent rated functional problems				-
Mean	47.25	45.44	47.93	44.07
Standard deviation	11.24	7.59	8.80	7.01

Note.

* $p < .05$; ** $p < .01$; *** $p < .001$.

8.5.2 Testing the compensatory model. To test the compensatory model depression was regressed on lability/negativity and the protective factor of emotion regulation. Table 15 presents the results. As shown, there was a significant prediction made by lability/negativity; however emotion regulation was not significant. This does not provide support for the compensatory model.

Table 15

Results from the Study 3 Regression Analysis for Testing the Compensatory Model

	<i>b</i>	<i>SE</i>	β	<i>t</i>
Lability/negativity	.50	.22	.45	2.30*
Emotion regulation	-.02	.46	-.25	-1.28

Note.

* $p < .05$; ** $p < .01$; *** $p < .001$.

8.5.3 Testing the risk-protective model. As with Study 1 and 2, centred scores were computed (raw score minus the mean score) and used for lability/negativity and emotion regulation in all moderation analyses. An interaction term (Lability/Negativity \times Emotion Regulation) was also created from the centred scores.

To test the risk-protective model in Step 1, depression was regressed on lability/negativity and emotion regulation. In Step 2, depression was regressed on the Lability/Negativity \times Emotion Regulation interaction term. The results are presented in Table 16. As shown, there was no significant prediction by the Lability/Negativity \times Emotion Regulation interaction terms and no significant change in the R^2 value between Step 1 and Step 2 indicating that these findings do not provide support for the risk-protective model.

Table 16

Results from the Study 3 Regression Analyses for Testing the Risk-Protective Model

	ΔR^2	b	SE	β	t
Lability/negativity		.49	.22	.44	2.21*
Emotion regulation		-.63	.47	-.27	-1.33
Lability/negativity \times emotion regulation	.01	.04	.08	.09	0.52
$R^2 = .40, F(3, 23) = 5.06$					

Note. b and β are unstandardised and standardised beta coefficients respectively, from step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

8.5.4 Testing the challenge model. The challenge model was tested using a hierarchical regression analysis. In Step 1 depression was regressed on lability/negativity. In Step 2 depression was regressed on the interaction term of

Lability/Negativity \times Lability/Negativity. The results are presented in Table 17. As shown, the Lability/Negativity \times Lability/Negativity interaction term was not significant and there were no significant changes in the R^2 value between Step 1 and Step 2. This does not support the challenge model.

Table 17

Results from the Study 3 Regression Analyses for Testing the Challenge Model

	ΔR^2	b	SE	β	t
Lability/negativity		.72	.19	.65	3.84**
Lability/Negativity \times Lability/Negativity	.03	-.03	.03	-.19	-1.11
$R^2 = .38, F(2, 24) = 7.39$					

Note. b and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

8.5.5 Testing the protective-protective model. To test the protective-protective model emotion regulation scores were recoded to reflect if the raw score was above the mean (1) or below the mean (0). The sample was split into either 0 or 1 protective factors. Depression was then regressed onto lability/negativity for each of the conditions. The results are presented in Table 18. As shown, the β value there is a small decrease from 0 protective factors to 1 protective factor indicating some protective value of 1 protective factor over no protective factors. This provides partial support the protective-protective model.

Table 18

Results from the Study 3 Regression Analyses for Testing the Protective-Protective Model

	<i>b</i>	<i>SE</i>	β	<i>t</i>
<i>0 protective factors</i>				
Lability/negativity	.60	.25	.55	2.43*
<i>1 protective factor</i>				
Lability/negativity	.72	.46	.47	1.58

Note. *b* and β are unstandardised and standardised beta coefficients respectively, from the step 2 of the regression equation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

8.6 Discussion

Study 3 was an explorative study investigating the applicability of the four models of resilience for the prediction of parent rated depression from lability/negativity and emotion regulation in children following TBI. The results showed that high parent ratings of children's depression symptoms were associated with high levels of lability/negativity, suggesting that lability/negativity is a potential risk factor for depression. High depression symptoms were also found to be associated with low reported levels of emotion regulation, which indicates that emotion regulation is a possible protective factor.

For the compensatory model of resilience it was hypothesised that a high level of lability/negativity would contribute positively, while a high level of emotion regulation would contribute negatively to the prediction of depression. Lability/negativity was found to significantly predict depression; however there was no significant prediction made by the protective factor of emotion regulation. This finding does not provide support for the compensatory model.

It was hypothesised for the risk-protective model that a high level of emotion regulation would reduce the strength of the relationship of lability/negativity with depression. There was no support found for the risk-protective model.

Lastly, for the protective-protective model it was hypothesised that the level of depression would be low for those with high level of emotion regulation (1 protective factor) compared to those with low level of emotion regulation (0 protective factor). The results indicated minimal benefit of 1 protective factor compared to 0 protective factors, providing partial support for the protective-protective model.

Parent ratings of children's depression symptoms and children's self-reported depression symptoms were similar with a significant moderate correlation which is consistent with previous research comparing the CDI and CDI-P (Kovacs, 2003) and provides a contribution to the field, indicating that children post mild TBI report similar levels of depression to those rated by their parents. These findings are also similar to those reported by Kirkwood and colleagues (2000) who compared children's ratings from the CDI and parents ratings of child depression on the CBCL. They found significant relationships between parent and child ratings of children's depression at both 6 and 12 month follow-up post severe TBI and at 6 month follow up post moderate TBI.

SES was found to have moderate negative relationships with parent ratings of children's depression and lability/negativity. This is similar to previous studies which have found relationships between SES and psychiatric disorders post-TBI (Max et al., 1998) and associations between SES and parents ratings of children's depression symptoms post-TBI (Kirkwood et al., 2000). It suggests that low SES is associated with higher levels of parent reported depression and lability/negativity in

children. In contrast to this SES was also found to have a strong positive relationship with emotion regulation.

In summary, the results indicated that high level of parent rated lability/negativity is associated with high level of depression in children post-TBI, while high level of emotion regulation was associated with low level of depression. It suggests that lability/negativity is a risk factor for depression and emotion regulation is a protective factor for depression in children post-TBI.

Support was not found for the compensatory model, the risk-protective model or the challenge model of resilience. Partial support was found for the protective-protective model indicating minimal protective value of 1 protective factor (high emotion regulation) compared to 0 protective factors (low emotion regulation).

8.6.1 Limitations. The explorative findings of Study 3 should be considered in light of methodological issues. As it was conducted in conjunction with Study 2 it has the same limitations in relation to recruitment difficulty resulting in a much smaller sample size than initially proposed which limited the possible analyses conducted. This also resulted in lower power for those analyses conducted and may have influenced the limited number of significant findings.

Study 3 was reliant on self-report measures completed by parents. Therefore, there is a possibility that the findings are confounded by common method variance. Also, with the use of correlations it is not possible to infer causal relationships between the variables.

Chapter 9 will provide an overview of the results from Studies 1, 2 and 3, conducted as part of the present thesis and discuss the implications of these findings as well as suggestions for future research.

Chapter 9

General Discussion

Application and investigation of the models of resilience allows for the ability to expand knowledge and understanding into potential risk and protective factors associated with negative outcomes (Zimmerman & Arunkumar, 1994). The present thesis explored an area as yet studied, the prediction of depression (outcome) from negative affect (risk factor) and emotional intelligence (protective factor) in children. As discussed in Chapter 3, depression is one of the more common psychiatric issues presenting during childhood which can have a long term impact on functioning (Silk et al., 2007).

As discussed in Chapter 4, TBI is a common cause of injury in children and adolescents with high rates in particular of mild TBI (McKinlay et al., 2008). Children post-TBI have been found to display an impaired ability to regulate their emotions (Ganesalingam et al., 2006) and there is growing research suggesting that they are at an elevated risk for depression symptoms (Kirkwood et al., 2000; Luis & Mittenberg, 2002).

The aim of the present thesis was to examine the applicability of the four models of resilience in relation to the prediction of depression from negative affect and emotional intelligence in children. Study 1 investigated this in a population of children without any pre-existing conditions. Two further explorative studies were then conducted examining the applicability of resilience models in children following mild TBI utilising child and parent reports. The thesis provided insight into the risk and protective factors of negative affect and emotional intelligence and their relationship with depression in children.

9.1 Overview of the Findings

Study 1 examined the applicability of the four models of resilience depicting the concurrent effects of negative affect and emotional intelligence on depression in a sample of 82 primary school children. The results suggested that negative affect is a risk factor for depression, while the emotional clarity and mood repair components of emotional intelligence are protective factors for depression in children. These findings are consistent with previous research which has found positive correlations between negative affect and depression in children (Crook, Beaver, & Bell, 1998; Laurent et al., 1999; Lonigan 2003; Lonigan et al., 1999). They also expand on findings which have found negative correlations between emotional intelligence and depression in children (Rockhill & Greener, 1999) which furthers suggestions that emotional intelligence skills may result in individuals being less prone to depression. In relation to the hypotheses regarding the four models of resilience investigated support was found for the compensatory model for emotional clarity and mood repair; partial support was found for the risk-protective model for emotional clarity; support was found for the challenge model and lastly partial support was found for the protective-protective model.

Study 1 expanded on current knowledge by investigating the applicability of resilience models in relation to the prediction of depression from negative affect and emotional intelligence in children. The results highlight the complex relationships between the variables and the importance of children's ability to identify which emotions they are experiencing and their ability to manage these.

Expanding on the findings of Study 1, Study 2 examined the applicability of resilience models in relation to the prediction of depression from negative affect and emotional intelligence within a clinical population of children following a mild TBI.

As discussed in section 4.3.2, there is growing evidence that children, similar to adults, are at an increased risk of psychiatric outcomes, including depression post-TBI (Kirkwood et al., 2000; Luis & Mittenberg, 2002). Study 2 aimed to extend current understanding of the risk and protective factors related to depression in children post-TBI. This has practical implications for informing post mild TBI assessments and intervention programs.

Study 2 was comprised of a sample of 32 children who had sustained a mild TBI between 3 and 33 months previously. Consistent with Study 1 findings, negative affect was found to significantly and positively associate with depression, suggesting that it is a risk factor for depression in children post mild TBI. Emotional clarity and mood repair were also found to correlate negatively with depression, indicating that they are both protective factors for depression. As in Study 1, emotional attention was not found to correlate with depression.

Analyses comparing relevant means and correlations between Study 1 and Study 2 measures found no significant differences. In relation to the risk factor of negative affect almost identical positive correlations between negative affect and depression were found in the studies. These findings were consistent even with different self-report measures of depression used in the two studies. As with the risk factor, similar correlations were found between Study 1 and 2 for the potential protective factors of emotional attention and emotional clarity. Emotional attention however had a negligible correlation with depression and as shown in the compensatory and risk-protective analyses were not found to be a protective factor for depression in either study. In comparison, emotional clarity was found to have a significant negative relationship with depression, indicating that it is a protective factor. Although the difference between the Study 1 and Study 2 correlations for

mood repair and depression were not found to be significantly different, in Study 1 the negative correlation was small and non-significant while in Study 2 the negative correlation between mood repair and depression was medium strength and highly significant.

In relation to the four hypotheses for Study 2, mood repair was found to provide support for both the compensatory and risk-protective models of resilience, while partial support was found for the challenge and protective-protective models of resilience. Comparing Study 1 and 2 findings for the compensatory model support was found for emotional clarity and mood repair in Study 1 and for just mood repair in Study 2. Given the reduced number of participants in Study 2 the prediction found by mood repair likely reflects the strength of the negative relationship between mood repair and depression.

The risk-protective model received partial support in Study 1 with a non-significant trend for emotional clarity where as full support for mood repair was shown in Study 2. This suggests that for children following mild TBI they were found to benefit from mood repair reducing the strength of the relationship between negative affect and depression.

Full support was also found for the challenge model in Study 1 where as a non-significant trend was found for Study 2. Although the Study 1 analysis provided support for the challenge model, as depicted in Figure 6, depression was found to increase as negative affect increased at all levels of negative affect until the highest negative affect scores where the associated increase in depression reduces and levelled. This curvilinear relationship was consistent with the Study 2 results depicted in Figure 8 although the interaction term approached significance, indicating partial support for the challenge model.

Lastly, in relation to the protective-protective model both Study 1 and Study 2 provided partial support. Study 1 indicated a greater benefit of two protective factors, with minimal benefit found between 1 protective factor and none. In contrast, results from Study 2 suggested a greater benefit of one protective factor compared to 2 protective factors or none. Given this, replication of these findings is required.

Although only limited conclusions can be drawn from the Study 2 results given the limited sample size the findings suggest that mood repair acts as a strong protective factor for children post mild TBI. In contrast, children in Study 1 were found to benefit most from the emotional clarity protective factor.

While Studies 1 and 2 investigated the four models of resilience in children utilising self-report measures, Study 3 was an exploratory study with measures obtained from reports of parents of children post mild TBI. It was comprised of a sample of 31 parents whose children had sustained a mild TBI and had participated in Study 2. The aim of Study 3 was to conduct an exploratory investigation into the applicability of the four models of resilience in the prediction of depression from level of lability/negativity and emotion regulation in children who had previously sustained a mild TBI as rated by parents.

Results from the Study 3 analysis found that higher ratings of lability/negativity were significantly associated with higher levels of depression in children and suggests that lability/negativity was a risk factor for depression. It was also found that higher levels of emotion regulation were significantly associated with lower levels of depression suggesting that emotion regulation was a protective factor for depression. In relation to the four models of resilience no support was found for the compensatory, risk-protective or challenge models of resilience in the prediction

of depression from lability/negativity and emotion regulation in children post mild TBI as rated by parents. Partial support was found for the protective-protective model, although not a significant change, a small weakening in the relationship between lability/negativity and depression was found for those children rated with higher levels of emotion regulation than those with no protective factor.

In comparison to the child rated measures in Study 2, parent ratings of their child's depression overall were similar with a significant positive correlation between the total scores which is consistent with previous research (Kovacs, 2003). Further the mean *T*-scores for overall depression rated by children and parents were also similar with slightly more variation in the scores reported by the children than parents. This suggests that overall in the present sample there was agreement in the levels of depression rated by children and parents.

When SES was considered with the child rated measures it was found to only correlate significantly with vocabulary. However, although not significant, there was a medium strength negative correlation between child rated depression and SES. The lack of significance may reflect the small sample size and therefore lower power. In relation to Study 3, SES correlated significantly with each of the parent rated measures. A highly significant large positive correlation was found between emotion regulation and SES, indicating higher levels of emotion regulation skills were associated with higher level of SES. SES also had medium strength negative correlations with depression and lability/negativity, suggesting lower levels of SES was associated with higher levels of depression and lability/negativity. These findings are consistent with those of Kirkwood and colleagues (2000) who found SES had a significant influence on depression ratings made by both children and

parents, specifically lower SES was associated with higher levels of depression symptoms reported by both children post-TBI and their parents.

Although not including post-TBI samples, a meta-analysis conducted by Letourneau, Duffett-Leger, Levac, Watson and Young-Morris (2013) looking at SES and child development found of the five studies included that there was a very small however significant negative relationship between internalising behaviours, such as depression and SES. A number of factors were also highlighted in the research review which were found to moderate this relationship between SES and depression including negative parenting (Dallaire et al., 2008) and higher levels of family supports (Guerrero, Hishinuma, Andrade, Nishimura, & Cunanan, 2006).

The current thesis has provided findings consistent with previous research suggesting that negative affect is a risk factor for depression while components of emotional intelligence are protective factors for depression. It has expanded the knowledge in the field by investigating the applicability of the four models of resilience in relation to the prediction of depression by negative affect and emotional intelligence. The present thesis being the first research to investigate these factors and to further explore these relationships with children post mild TBI. In addition, conducted an exploratory study utilising parent reports of children post mild TBI. These findings provide insight into the relationships between negative affect, emotional intelligence and depression in uninjured children and children post mild TBI.

9.2 Clinical Implications

Depression is a common mental health concern with long-term consequences as the majority of children who develop depression will go on to experience recurrent episodes (Rudolph & Lambert, 2007; Silk et al., 2007). Further, adolescents who

experience depression are at a two to three times higher risk to experience depression or anxiety in adulthood (Sawyer et al., 2001). The findings presented in this research highlight negative affect and emotional intelligence as two factors associated with childhood depression which is consistent with previous research suggesting that symptoms of depression are associated with impairments in affect regulation (Garber et al., 1995; Garber, Braafladt, & Zeman, 1991). Depressed children have been found to have particular difficulties in regulating negative affect, employing less effective strategies and having less belief in regulation strategies than non-depressed children. Identification of children at higher risk for depression such as those with higher levels of negative affect can assist clinicians to provide further assessment and treatment. Strategies to self-regulate negative affect are taught within childhood depression interventions such as cognitive behavioural therapy (e.g., Asarnow et al., 2002).

Typically for children post-TBI the focus of assessment and intervention is on medical and cognitive issues (Luis & Mittenberg, 2002). Highlighted in the review of previous research is that there is a growing understanding that TBI can also be associated with a number of psychiatric outcomes including internalising conditions such as depression (see Chapter 4). The findings from the present study suggest that in particular, mood repair that is the child's ability to regulate their mood was an important protective factor for depression. As children post-TBI have been found to display deficits in their ability to regulate their emotions the present findings suggest the importance for clinicians to be aware of potential risk factors and include within the assessment measures of emotional functioning (Ganesalingam et al., 2006). Psycho-education should also be provided to all parents of children post-TBI regardless of severity around possible psychiatric outcomes, indicators of these and

support options including CBT which has been found to provide an effective intervention for post-TBI children (Pastore et al., 2011).

9.3 Future Directions

Further studies investigating the application of the models of resilience to the prediction of depression by negative affect and emotional intelligence in children is required to validate the current findings. The present thesis provided an explorative study of the models of resilience with a post mild TBI clinical population. Utilising larger sample sizes will increase the power of the analyses and also assist to extrapolate differences between post mild TBI children and non-TBI children. Access to larger samples may also allow for inclusion of children post moderate and severe TBI and comparison of these children with those post mild TBI.

As previously mentioned, one limitation of the current mild TBI sample was the variation in time since injury among the sample. Future research would preferably utilise a sample which would be followed from time of the initial injury in a longitudinal design, allowing comparisons to be made over multiple time points. This would further allow for the inclusion of other possible confounding variables to be measured such as, family history of mood disorders, pre-injury psychiatric conditions, and measures of family functioning.

Another consideration for future research would be to include an appropriate comparison group acquired from the same population as those in the mild TBI group. For example as suggested by Kristman and colleagues (2014) utilising a population of individuals who present at hospital emergency department where a TBI group can be identified along with providing a population from where a comparison group can be drawn. With a larger cohort of potential participants future research could also explore possible gender differences in resilience post TBI.

A factor which wasn't explored in the current studies due to the design was gathering data on why participants decided not to participate. Further, comparisons in demographic information could be made between those in the sample that chose not to participate and those that did to ensure that the research sample was reflective.

In conclusion the findings in the current thesis expand on previous research by investigating the applicability of resilience models, however require further validation with larger studies. The findings do highlight the importance of clinicians being aware of the risk and protective factors associated with depression in children and particularly the need to be sensitive to the psychiatric outcomes in children post mild TBI.

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Appendix A

Descriptive Statistics and Analyses of Demographic Data for Study 1


See CD

Independent Samples t -test for Male and Female Mean Age

Independent Samples t -test for Male and Female Mean Grade

Appendix B

Ethics Approval for Study 1

<p style="font-size: 2em; margin: 0;">COPY</p> <p style="margin: 0;">MEMORANDUM</p>	<p>Private Bag 01 Hobart Tasmania 7001 Australia Telephone (03) 6226 2764 Facsimile (03) 6226 7148 Marilyn.Knott@utas.edu.au http://www.research.utas.edu.au/index.htm</p>	
<p>HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK</p>		

FULL COMMITTEE ETHICS APPLICATION APPROVAL

28 October 2008

Dr Rapson Gomez
Psychology
Private Bag 30
Hobart

Ethics reference: H10299

The association of how children experience negative affect and manage emotions with their moods.

Masters student: Natasha Laird

Dear Dr Gomez

The Tasmania Social Sciences HREC Ethics Committee approved the above project on 28 October 2008.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on Ethical Conduct in Human Research* (NHMRC 2007).

Therefore, the Chief Investigator's responsibility is to ensure that:

- 1) All researchers listed on the application comply with HREC approved application.
- 2) Modifications to the application do not proceed until approval is obtained in writing from the HREC.
- 3) The confidentiality and anonymity of all research subjects is maintained at all times, except as required by law.
- 4) Statement 5.5.3 of the National Statement states:

Researchers have a significant responsibility in monitoring approved research as they are in the best position to observe any adverse events or unexpected outcomes. They should report such events or outcomes promptly to the relevant institution/s and ethical review body/ies and take prompt steps to deal with any unexpected risks.

- 5) All participants must be provided with the current Information Sheet and Consent form as approved by the Ethics Committee.

- 6) The Committee is notified if any investigators are added to, or cease involvement with, the project.
- 7) This study has approval for 4 years contingent upon annual review. A *Progress Report* is to be provided on the anniversary date of your approval. You will be sent a courtesy reminder closer to this due date.
- 8) A *Final Report* and a copy of the published material, either in full or abstract, must be provided at the end of project.

Yours sincerely



Ethics Executive Officer

Appendix C

Educational Performance Services Approval for Study 1

Department of Education
EDUCATIONAL PERFORMANCE SERVICES

2/99 Bathurst Street, Hobart
GPO Box 169, Hobart, TAS 7001 Australia



File779583

22 December2008

Professor Rapson Gomez
School of Psychology
University of Tasmania
Private Bag 30
HOBART TAS 7001

Dear Professor Gomez

The association of how children experience negative affect and manage their emotions with their moods

I have been advised by the Educational Performance Research Committee that the above research study adheres to the guidelines established and that there is no objection to the study proceeding.

Please note that you have been given permission to proceed at a general level, and not at individual school level. You must still seek approval from the principals of the selected schools before you can proceed in those schools. It would also be appreciated if you could advise the Research Committee of the names of the schools that will be participating in the project, once these have been selected.


A copy of your final report should be forwarded to Patricia Lloyd, Educational Performance Services, Department of Education, GPO Box 169, Hobart 7001 at your earliest convenience and within six months of the completion of the research phase in the Department of Education schools.

Yours sincerely

Manager
(Educational Performance Services)
Cc Natasha Laird

Appendix D

Cover Letter and Plain Language Statement Sent to Principals in Study 1

<p>15th March, 2009</p>	<p>Private Bag 30 Hobart Tasmania Australia 7001 Phone (03) 6226 2237 Fax (03) 6226 2883</p>	
<p>SCHOOL OF PSYCHOLOGY</p>		

Cover Letter

Dear,

I am a student at the University of Tasmania contacting you regarding the possibility of recruiting participants for a research study I am conducting as part of the requirements of Master of Psychology in the School of Psychology. The main aim of the study is to investigate the association of children's experience of negative affect and how they manage their emotions with moods such as sadness or feeling upset.

The current research study has gained approval from the Educational Performance Services, Department of Education. It has also been approved by the Tasmanian Social Science Human Research Ethics Committee.

Please find enclosed in this package an information sheet for principals which provides details of what the study involves. I have also enclosed a copy of the approval obtained from the Educational Performance Services, Department of Education and the approval obtained from the Tasmanian Social Science Human Research Ethics Committee, as well as a copy of the information sheet and consent form for parent/guardian; a copy of the information sheet and consent form for the children and lastly, a copy of the questionnaire booklet.

I appreciate your time in considering this research study. If you have any questions regarding this study or have come to a decision on your school participating, you can contact me at email nelaird@utas.edu.au or contact the Principal Researcher Professor Rapson Gomez of the School of Psychology on telephone number (03) 6226 2887 or email rapson.gomez@utas.edu.au.

I hope to hear from you soon, and I hope your school will be able to participate in this research study.

Natasha Laird (Master of Psychology Student)
School of Psychology
University of Tasmania
Private Bag 30
Hobart Tasmania 7001

21st August, 2008

Private Bag 30 Hobart
Tasmania Australia 7001
Phone (03) 6226 2237
Fax (03) 6226 2883



SCHOOL OF PSYCHOLOGY

PLAIN LANGUAGE STATEMENT FOR PRINCIPALS

Project Title

The Association of how Children Experience Negative Affect and Manage Emotions with Their Moods

Investigators

Student Researcher: Natasha Laird, Master of Psychology Student

Staff Supervisor: Professor Rapson Gomez, Director of Clinical Training, School of Psychology.

Aims of study

The main aim of the study is to examine the association of children's experience of negative affect and how they manage their emotions with their moods such as sadness or feeling upset. Negative affect is a general state of emotional distress, representing the extent to which the child feels upset rather than peaceful.

Procedure

We hope to recruit children between the ages of 8 – 11 attending primary schools for this study. We have obtained approval from the Tasmanian Social Science Human Research Ethics Committee and the Tasmanian Department of Education.

The method of recruitment of individual students for the study will be dependent of the wishes of individual school principals. As an example, all children who meet the age requirements will be given an envelope, and requested by their teachers to take it home for their parent(s)/guardian(s). The envelope will contain a plain language information sheet outlining the research, a consent form and a replied paid envelope.

For parents, the information sheet will explain the aim of the study and the nature of the questionnaires children whom participate will be asked to complete. All parents will be informed that there are no consequences if they do not decide to consent to their child's participation and that they are free to withdraw their consent and discontinue their child's participation in this study at any time prior to questionnaires being completed. Parents who give consent for their child participating in the present study will be asked to return the signed consent form to Natasha Laird, School of Psychology at the University of Tasmania using the replied paid envelope provided.

Following parent/guardian consent we would like to arrange for those children who have consent to attend a testing session. In consultation with the individual school principals these sessions will be held within the school in large groups, which the student researcher will run. Children will be provided with an age appropriate information sheet, which the student researcher will go through with them, and will have the opportunity to ask questions before being given a consent form to sign. Child assent to participate in the study will be required. Children will be informed that they are free to withdraw from participating with no consequence.

Children will then be presented with a booklet containing three pencil and paper questionnaires. Please find the questionnaires attached. These questionnaires have been chosen for their simplicity and age appropriateness. I will give the standard instructions for each questionnaire and ask the children to complete each of them. Children will be asked to not talk while completing them and to raise their hand if they have any questions. The three questionnaires provide measures of children's experience of emotions related to Negative Affect; children's perceived ability to identify, discriminate and manage emotions; and a measure of their overall mood. Each questionnaire requires the participants to make ratings on a given scale. The session will last for approximately 20 minutes.

In brief, the school will be involved in two ways. First in assisting in the distribution of the packages (containing information sheets, consent forms and replied paid envelopes) to parents, and second, by allowing the testing session to be held at the school.

I would like to ensure that all data provided by the participants is confidential. Parent/guardian and child consent forms will be stored separately from the completed questionnaire booklets; furthermore, no identifying information will be recorded on the booklets to ensure they are unidentifiable.

There are no specific risks associated with participation in this study. However, it can not be ruled out that some items/statements may cause some children to experience feelings of distress. The child information sheets contain information which suggests that if they are feeling down or worried to talk to their parents, friends or teacher. After consultation with the individual schools I will also provide both children and parents with contact details for each individual school's counsellor, guidance officer or psychologist. In addition, parents will be provided with contact detail for Centacare Tasmania which provides a counselling program for children, while both parents and children will be provided with contact details for Kids Helpline.

We will cover all costs and materials for the study. If you wish to know more about the study, you can contact me at nelaird@utas.edu.au or Professor Gomez on the telephone number or email provided below.

I hope to hear from you soon, and I hope your school will be able to participate in this research project.

Natasha Laird (Master of Psychology Student)
School of Psychology
University of Tasmania
Private Bag 30
Hobart Tasmania 7001

Any questions regarding this project can be directed to the Principal Researcher Prof. Rapson Gomez of the School of Psychology on telephone number (03) 6226 2887 or email rapson.gomez@utas.edu.au. Should you have any concerns about the conduct of this research project please contact the Executive Officer of the Human Research Ethics Committee (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. You will need to quote HREC project number: H10299.

Appendix E

Parent/Guardian Information Sheet and Consent Form for Study 121st August, 2008

Private Bag 30 Hobart
Tasmania Australia 7001
Phone (03) 6226 2237
Fax (03) 6226 2883



SCHOOL OF PSYCHOLOGY

PARENT/GUARDIAN INFORMATION SHEET
Master of Psychology Research

**The Association of how Children Experience Negative Affect and Manage
Emotions with Their Moods**

Invitation

Your child is invited to participate in a research study being conducted by Natasha Laird as part of the requirements of Master of Psychology in the School of Psychology at the University of Tasmania. It is being supervised by Professor Rapson Gomez, Director of Clinical Training, in the School of Psychology at the University of Tasmania.

1. What is the purpose of this study?

The purpose of this study is to investigate the association of children's experience of negative affect and how they manage their emotions with their moods such as sadness or feeling upset. Negative affect is a general state of emotional distress, representing the extent to which the child feels upset rather than peaceful. It can include different emotions such as sadness, fear and anger.

2. Why have I been invited to participate in this study?

Your child is eligible to participate in this study because he/she is between the ages of 8 - 11.

4. What does this study involve?

Following parent/guardian consent, children will be asked to attend a group session at your child's school. The researcher will go through an age appropriate information sheet regarding the purpose of the study with the children, including answering any questions they may have and provide them with the option not to participate with out any consequences. For children who assent to participate, the researcher will go through with them the age appropriate consent form and ask them to sign. Children will then be given a booklet containing three pencil and paper questionnaires, standard instructions for each one and asked to complete them. All questionnaires will remain confidential and unidentifiable as no identifying information will be recorded on the booklets, and the consent forms will be stored separately. The three questionnaires ask children to rate on a scale:

1) How much they have felt or acted a certain way in the past two weeks.

E.g. I felt so tired I just sat around and did nothing; I found it hard to concentrate properly.

2) To what extent they have felt a range of specific emotions during the past two weeks.

E.g. Frightened; happy; guilty; proud.

3) To what extent they agree with statements concerning their awareness and perceived control of their moods and emotions.

E.g. If I find myself getting mad, I try to calm myself down; I believe it's good for you to go ahead and feel whatever you feel.

Children will be provided with the opportunity to ask the researcher questions if they are unsure about any of the questionnaires. The session is expected to last for approximately 20 minutes.

It is important that you understand that your child's involvement in this study is voluntary. While we would be pleased to have them participate, we respect your right to decline. There will be no consequences to you or your child if you decide not to consent. If you decide to discontinue your child's participation at any time prior to completing the questionnaires, you may do so without providing an explanation. All information will be treated in a confidential manner, and your child's name will not be used in any publication arising out of the research. All of the research will be kept in a locked cabinet in the School of Psychology in the University of Tasmania.

5. Are there any possible benefits from participation in this study?

There are no expected direct benefits to children by participating in the study.

6. Are there any possible risks from participation in this study?

There are no specific risks anticipated with participation in this study. However, it can not be ruled out that some items/statements may cause some children to experience feelings of distress. Children will be advised to talk to parents, friends or their teacher if they feel down. If you are concerned about your child's behaviour or emotional state please contact Centacare Tasmania on (03) 6278 1660 as they provide a counselling program for children. Kids Helpline is also available and offers free counselling services to young people. They can be contacted on 1800 55 1800 and operate 24 hours a day, 7 days a week.

7. What if I have questions about this research?

If you would like to discuss any aspect of this study please feel free to contact either Natasha Laird at nelaird@utas.edu.au or alternatively Professor Rapson Gomez on ph 6226 2887 or email rapson.gomez@utas.edu.au. Either of us would be happy to discuss any aspect of the research with you. Once we have analysed the information we will be mailing your child's school a summary of our findings. You are welcome to contact us at that time to discuss any issue relating to the research study.

This study has been approved by the Educational Performance Services, Department of Education. It has also been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote HREC project number: H10299.

Thank you for taking the time to consider this study.

If you wish to allow you child to take part in it, please sign the attached consent form and return it by Monday 15th June to the School of Psychology using the supplied reply paid envelope.

This information sheet is for you to keep.

21st August, 2008

Private Bag 30 Hobart
Tasmania Australia 7001
Phone (03) 6226 2237
Fax (03) 6226 2883



SCHOOL OF PSYCHOLOGY

PARENT/GUARDIAN CONSENT FORM

Title of Project: The Association of how Children Experience Negative Affect and Manage Emotions with Their Moods

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study involves my child attending a group session within his/her school where he/she will be asked to complete three pencil and paper rating questionnaires. The questionnaires are focused on my child's experience of different emotions and how they manage them. The session will last for approximately 20 minutes.
4. I understand that there are no specific risks associated with participation.
5. I understand that all research data will be securely stored on the University of Tasmania premises for at least five years, and will be destroyed when no longer required.
6. Any questions that I have asked have been answered to my satisfaction.
7. I agree that research data gathered from my child for the study may be published provided that my child cannot be identified as a participant.
8. I understand that the researchers will maintain my own and my child's identity confidential and that any information my child or I supply to the researcher will be used only for the purposes of the research.
9. I consent for my child to participate in this study and understand that I may withdraw his/her participation at any time prior to completing the questionnaires without any effect. I understand that as the questionnaires are unidentifiable my child's data will be unable to be identified or removed after collection.

Name of parent/guardian:

Signature:

Date:

Name of child (please print):

School:

Grade/class:

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ Parents have received the Information Sheet where my details have been provided so they have the opportunity to contact me prior to consenting to their child participating in this project.

Name of Investigator _____

Signature of
Investigator _____

Name of investigator _____

Signature of investigator _____ Date _____

Thank you for taking your time to consider this study.

If you wish to allow your child to take part in the study, please sign this consent form and supply your child's name, school and grade/class in the space provided. Please return the signed form by Monday 15th June to the School of Psychology in the University of Tasmania using the replied paid envelope provided.

Appendix F

Child Information Sheet and Consent Form for Study 1

21st August, 2008

Private Bag 30 Hobart
Tasmania Australia 7001
Phone (03) 6226 2237
Fax (03) 6226 2883



SCHOOL OF PSYCHOLOGY

PARTICIPANT INFORMATION SHEET
Master of Psychology Research

**The Association of how Children Experience Negative Affect and Manage
Emotions with Their Moods**

What the study is about

My name is Natasha and I am a student at the University of Tasmania. As part of my degree in psychology I am doing a study to learn about children's feelings such as sadness and loneliness. We know that children experience different feelings and that they also have different thoughts about their feelings and how they deal with them. Negative affect are different upsetting feelings such as feeling scared, sad or angry. The study will help us find out the different feelings children experience, such as being upset or unhappy, and how they are able to deal with them. This study will tell us how we can better help children who are upset.

If you agree to take part, I will ask you to complete some questions. You will be asked to give your answers by either ticking boxes or circling numbers. These will take about 20 minutes to complete. The questions are about how you have been feeling and the different ways in which you think and dealt with these feelings.

When these questions were answered by other children, they didn't feel upset. You probably will not either, but if some of the questions make you sad or upset, it often helps to talk to others, such as your parents, friends, or teacher. You can also speak to your school counsellor or psychologist. If you do feel upset you can also call Kids Helpline on 1800 55 1800 and talk to a counsellor.

Protecting your privacy or keeping you safe

If you agree to take part in this study, you will complete a consent form. The consent form will be kept separately from the answers you give for the questions about your feelings. This means that no one will be able to know who gives the answers to the questions, including your teachers or parents. When we write up the report of our study, we will not mention the names of children who participated. We will look at the answers of all the children together and not separately. Also, government laws, your school and the University supporting this study all require the Researchers to protect children's privacy and that this will be done.

Choice

You are totally free to fill out the questionnaires or decide not to. We have already asked your parents (or guardians) for permission. If you have any questions about the study please ask Natasha. If you decide to do the questionnaires, please read through and sign the attached consent form and hand it to Natasha.

If you have questions or complaints

For questions or complaints, please contact your parents, teacher, the School Counsellor or the Researchers: Natasha Laird at nelaird@utas.edu.au or Professor Rapson Gomez (Senior Researcher) on (03) 6226 2887, or rapson.gomez@utas.edu.au. This study has been approved by the Educational Performance Services, Department of Education. It has also been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have any questions or concerns that the Researchers cannot answer, please contact: Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote HREC project number: H10299.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form and return it to Natasha.

This information sheet is for you to keep.

21st August, 2008

Private Bag 30 Hobart
Tasmania Australia 7001
Phone (03) 6226 2237
Fax (03) 6226 2883



SCHOOL OF PSYCHOLOGY

PARTICIPANT CONSENT FORM

Title of Project: The Association of how Children Experience Negative Affect and Manage Emotions with Their Moods

1. I have read and understood the 'Information Sheet' for this study.
2. It has been explained to me what the study is about and any possible effects it might have.
3. I understand that the study involves me completing three pencil and paper questionnaires. The questionnaires are focused on my experience of different emotions and how I deal with them. The session will last for approximately 20 minutes.
4. I understand that there are no specific risks associated with participation.
5. I understand that all research data will be securely stored at the University of Tasmania for at least five years, and will be destroyed when no longer needed.
6. I have asked any questions I wanted to and am happy with the answers I have received.
7. I agree that the answers gathered from me on the questionnaires for the study may be published but I will not be identified as a participant.
8. I understand that the researchers will make sure no one will know who filled out each questionnaire and that any information I supply to the researcher will be used only for the purposes of the study.
9. I agree to participate in this study and understand that I may withdraw at any time without any effect.

Name of Participant:

Signature:

Date:

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so they have the opportunity to contact me prior to consenting to their participation in this project.

Name of Investigator

Signature of
Investigator

Name of investigator _____

Signature of investigator _____ Date _____

Appendix G

SPSS Raw Data: Study 1

See CD

Appendix H

SPSS Analyses Output: Study 1

See CD

- H1 Descriptive Statistics and Correlations between Study 1 Measures
- H2 Regression Analyses for the Compensatory Model: Study 1
 - Compensatory Model: Negative Affect and Emotional Attention
 - Compensatory Model: Negative Affect and Emotional Clarity
 - Compensatory Model: Negative Affect and Mood Repair
- H3 Regression Analyses for the Risk-Protective Model: Study 1
 - Risk-Protective Model: Negative Affect and Emotional Attention
 - Risk-Protective Model: Negative Affect and Emotional Clarity
 - Risk-Protective Model: Negative Affect and Mood Repair
- H4 Simple Slopes Computation for Negative Affect \times Emotional Clarity
 - Interaction: Study 1
- H5 Regression Analyses for the Challenge Model: Study 1
- H6 Regression Equation Analyses for Negative Affect \times Negative Affect
 - Interaction Effect: Study 1
- H7 Regression Analyses for the Protective-Protective Model: Study 1
 - Protective-Protective Model: 0 Protective Factors
 - Protective-Protective Model: 1 Protective Factor
 - Protective-Protective Model: 2 Protective Factors

Appendix I

Descriptive Statistics and Analyses of Demographic Data for Study 2

See CD

Appendix J

Ethics Approval for Study 2 and Study 3

Office of Research Services
University of Tasmania
Private Bag 1
Hobart Tasmania 7001
Telephone + 61 3 6226 7479
Facsimile + 61 3 6226 7148
Email Human.Ethics@utas.edu.au
www.research.utas.edu.au/human_ethics/

HUMAN
RESEARCH
ETHICS
COMMITTEE
(TASMANIA)
NETWORK



24 January 2010

A/Prof. Clive Skilbeck
C/- School of Psychology
University of Tasmania
Private Bag 30
Hobart TAS 7001

Dear Associate Professor Skilbeck,

REF NO: H11378

TITLE: Paediatric Traumatic Brain Injury: Social Cognition and Emotion Functioning

- Information Sheet and Consent Form for Parent of Child under 12
- Information Sheet and Consent Form for Parent of child over 12
- Application Form- NEAF
- Information Sheet and Consent Form for Young Person
- Parent Phone Call Script
- Study Protocol
- Questionnaires:
 - Child Behaviour Checklist (CBCL; Achenbach, 2001).
 - Behaviour Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy & Kenworthy, 2000).
 - Vineland Adaptive Behaviour Scales- Second Edition (Vineland-II: Sparrow, Cicchetti & Balla, 2005).
 - Child Depression Inventory: Parent and Child versions (CDI; Kovacs, 2004).
 - The Storybook.
 - Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999).
 - Trait Meta-Mood Scale for Elementary School Children (TMMS-C; Rockhill & Greener, 1999)
 - Levels of Emotional Awareness Scale for Children (LEAS-C; Bajgar et al., 2005)

The Tasmania Health and Medical Human Research Ethics Committee considered and approved the above documentation on **21 January 2011**.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on the Ethical Conduct Human Research* (NHMRC 2007).

Therefore, the Chief Investigator's responsibility is to ensure that:

- (1) The individual researcher's protocol complies with the HREC approved protocol.
- (2) Modifications to the protocol do not proceed until **approval** is obtained in writing from



the HREC.

(3) Section 5.5.3 of the National Statement states:

Researchers have a significant responsibility in monitoring approved research as they are in the best position to observe any adverse events or unexpected outcomes. They should report such events or outcomes promptly to the relevant institution/s and ethical review body/ies and take prompt steps to deal with any unexpected risks.

The appropriate forms for reporting such events in relation to clinical and non-clinical trials and innovations can be located at the website below. All adverse events must be reported regardless of whether or not the event, in your opinion, is a direct effect of the therapeutic goods being tested. http://www.research.utas.edu.au/human_ethics/medical_forms.htm

(4) All research participants must be provided with the current Patient Information Sheet and Consent Form, unless otherwise approved by the Committee.

(5) The Committee is notified if any investigators are added to, or cease involvement with, the project.

(6) This study has approval for 4 years contingent upon annual review. A *Progress Report* is to be provided on the anniversary date of your approval. Your first report is due **21 January 2012**. You will be sent a courtesy reminder closer to this due date.

(7) A *Final Report* and a copy of the published material, either in full or abstract, must be provided at the end of the project.

Should you have any queries please do not hesitate to contact me on (03) 6226 1956.

Yours sincerely

Adele Kay
Health and Medical HREC Ethics Officer
On behalf of the Executive Officer
HREC (Tas) Network



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HUMAN
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ETHICS
COMMITTEE
(TASMANIA)
NETWORK



29 April 2011

A/Prof. Clive Skilbeck
C/- School of Psychology
University of Tasmania
Private Bag 30
Hobart TAS 7001

Dear Associate Professor Skilbeck,

REF NO: H11378

TITLE: Paediatric Traumatic Brain Injury: Social Cognition and Emotion Functioning

- *Inclusion of Emotion Regulation Checklist for Parents*

The Tasmanian Health and Medical Human Research Ethics Committee considered and approved the above documentation at its meeting on **18 April 2011**.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on Ethical Conduct in Human Research* (NHMRC 2007).

Should you have any queries please do not hesitate to contact me on (03) 6226 1956.

Yours sincerely,

Adele Kay
Ethics Officer, Health and Medical
On behalf of the Executive Officer
HREC (TAS) Network



A PARTNERSHIP PROGRAM BETWEEN THE DEPARTMENT OF HEALTH AND HUMAN SERVICES AND THE UNIVERSITY OF TASMANIA

Appendix K

Parent/Guardian Information Sheet and Consent Form for Study 2 and Study 3

Dear Parent/Guardian,

Paediatric Traumatic Brain Injury: Social Cognition and Emotional Functioning

You and your child are invited to take part in a research study exploring children's recovery after a head injury. The study is being conducted by researchers from the University of Tasmania:

- Associate Professor Clive Skilbeck, a Senior Clinical Neuropsychologist.
- Natasha Laird and Sinead Marriott, Clinical Psychology Doctoral candidates.
- Professor Rapson Gomez, a Clinical Psychologist.
- Dr. Nenagh Kemp, lecturer in Psychology.

Purpose of the study?

The study aims to investigate children's recovery after a head injury. The research is exploring families' rehabilitation needs, and predictors of social and emotional functioning.

What does your, and your child's, participation involve?

He/She will be asked to complete an assessment at the RHH or University of Tasmania. This will take approximately 60-70 minutes, during which time in a separate room you will be asked to fill-in some questionnaires about your child's social development, mood, functioning and behaviour, as well as your family's socio-economic background. At the same time, your son/daughter will complete a number of tasks. Some of these tasks are fun and seem like games. They cover:

- Matching pictures and words
- Listening to a story and then answering questions about it
- Naming the shape and direction of figures, using colours, shapes and arrows
- Matching and recognising emotions from photographs of faces
- Recalling strings of numbers
- Copying symbols
- Selecting a picture that is the 'odd one out', from a choice of 5
- Building a series of towers
- Describing a picture using key words
- Defining what some words mean
- Being read some short scenarios featuring two people and asked to describe how they would feel in that scenario and how the other person would feel.

If your child is between the ages of 8 and 13 they will also complete some brief questionnaires that involve asking about their thoughts and feeling over the past two weeks and their understanding of their ability to manage these feelings. You will also be asked to complete a brief questionnaire asking about your observations of your child's moods recently. One of these measures you and your child will complete is a measure of depression symptoms. Your child will be asked to select a response from three possible response choices for each item, indicating their experiences in the last two weeks. For example:

I do not feel alone
 I feel alone many times
 I feel alone all the time

The measure also includes two items concerning suicidal thoughts and if the child feels loved. If you would like the opportunity to view all the questions or have any concerns regarding your child completing this measure please discuss it with the researcher.

All questionnaires/tasks included in this study are age appropriate and are commonly used in both research and clinical settings. Although unlikely, if you or your child becomes distressed as a result of participating in this study, the researchers are available to discuss any concerns and offer you support. Please contact the Kids Helpline (1800 55 1800) if further assistance is needed.

Is my child eligible?

Your child is eligible to join the research if he/she had a recent head injury. They cannot join if they have had more than one significant head injury, have a significant neurological condition (e.g., Epilepsy, Autism), or if their first language is not English. Please let us know if you believe your child is not eligible.

Confidentiality and Anonymity

The identity of all children in this study will remain confidential, and their data will be retained, in secure filing cabinets and computers at the University, for a minimum of five years after publication of the study's findings. To ensure anonymity for your child, code numbers will be used to identify data, and only group data will be reported in any publications. The group results will be available to all participants on the University of Tasmania School of Psychology website at the end of this study: <http://fcms.its.utas.edu.au/scieng/psychol/> or you can obtain a copy from the researchers:

Natasha Laird (nelaird@utas.edu.au)

Sinead Marriott (sineadm@utas.edu.au)

If your child were to suffer a brain injury in the future, the information obtained in this study could be beneficial to the medical team. So, the information collected in this study will be kept, in an electronic secure file, by Associate Professor Clive Skilbeck, in case the information needs to be retrieved in the future (clive.skilbeck@utas.edu.au)

Freedom to refuse or withdraw

Helping with this research is entirely voluntary. Children and parents are free to refuse to join or withdraw at any time, without prejudice.

This study has been granted ethical approval by the Human Research Ethics (Tasmania) Network (H0011378). If you have any concerns, of an ethical nature, or complaints about the manner in which this study is being conducted you can contact the Ethics Executive Officer (03 6226 7479 or human.ethics@utas.edu.au).

Feedback

After your child's assessment, you can receive verbal feedback about their results. If you would like to receive feedback please tick the box on the consent form. A brief written copy of this feedback can also be provided if you wish.

Thank you for taking the time to consider this study. If you wish to take part in it, please sign the attached consent form. This information sheet is for you to keep. We hope you will be willing to help us in this study.

Regards,

A/Prof. Clive Skilbeck, Prof. Rapson Gomez, Dr. Nenagh Kemp, Natasha Laird and Sinead Marriott.



Parent/Guardian Consent Form

Paediatric Traumatic Brain Injury: Social Cognition and Emotional Functioning

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand the study involves me and my son/daughter attending the RHH/LGH for approximately 60-70 minutes to complete a series of questionnaires and tasks.
4. I understand that all research data will be securely stored on the University of Tasmania premises for at least five years. I also understand that electronic files will continue to be held by the primary researcher in case my child suffers a brain injury in the future and it needs to be accessed.
5. Any questions that I have asked have been answered to my satisfaction.
6. I agree that research data gathered from me for the study may be published provided that I cannot be identified as a participant.
7. I understand that the researchers will maintain my identity confidential and that any information I supply to the researchers will be used only for the purposes of the research.
8. I agree to participate in this investigation and understand that I may withdraw at any time without any effect, and if I so wish may request that any data I have supplied to date be withdrawn from the research.

I (parent's/guardian's name) agree to the information above and give permission for my son/daughter..... (child's name) to participate in this research.

☐ Yes I would like to receive verbal feedback about their results (please tell the researcher if you would also like brief written feedback)

Date of child's injury:..... Child's Date of birth:.....

Signed: Date:.....

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator

Signature of
Investigator

Appendix L

Child Information Sheet and Consent Form for Study 2

Dear Participant,

INFORMATION SHEET:

Paediatric Traumatic Brain Injury: Social Cognition and Emotional Functioning

What the study is about?

Our names are Sinead and Natasha and we are students at the University of Tasmania. As part of our Psychology degree we are doing a study to learn about children's recovery after a head injury. We know that some children have problems after a head injury. Our study will help us understand these problems and how we can help.

If you agree to take part, you will complete some tasks taking around 60-70 minutes while your parent (or guardian) fills in some questionnaires in a separate room. Some of these are fun and seem like games. They may include such things as:

- Matching and recognising emotions from photographs of faces
- Recalling strings of numbers
- Describing what some words mean
- Being read some short stories and then asked to describe how you would feel in that situation.

You will also fill in some brief questionnaires that involve asking about how you have been feeling recently and the different ways you think and deal with feelings such as sadness, fear and anger. If you find any of these questions or any of the other tasks upsetting please tell either Sinead or Natasha and we can stop doing the task.

Protecting your privacy or keeping you safe

If you agree to help our research, you will complete a consent form. This will be kept separate from the answers you give for the tasks. A code number will be used on all of the tasks you complete. This means that no one will know which answers are yours. When we write the report of our study, we will not include your name. We will look at the answers of all the children as a group, and not separately. A brief Report of group results will be available to you on the University of Tasmania School of Psychology website at the end of this study:

<http://fcms.its.utas.edu.au/scieng/psychol/> or you can obtain a copy from the researchers:

Natasha Laird (nelaird@utas.edu.au)

Sinead Marriott (sineadm@utas.edu.au)

If you have another head injury in the future, your doctors may find it helpful to look at your results in our study. So, your answers will be kept in a secure computer file by Associate Professor Clive Skilbeck, in case the information is needed in the future:

(clive.skilbeck@utas.edu.au)

Choice

You are totally free to do the tasks or not. We have also asked your parents (or guardians) for permission. If you have any questions about the study please ask either Sinead or Natasha. If you decide to do the tasks we will go through the consent form with you.

For questions or problems, please contact your parents or the researchers: Sinead Marriott at sineadm@utas.edu.au; Natasha Laird at nelaird@utas.edu.au; or Associate Professor Clive Skilbeck at clive.skilbeck@utas.edu.au. This study has been approved by the Human Research Ethics (Tasmania) Network (H11378). If you have any ethics questions or concerns, or complaints about how this study is carried out, you can contact the Ethics Executive Officer (03 6226 7479 or human.ethics@utas.edu.au).

Thank you for taking the time to consider this study. If you wish to take part, please sign the attached consent form. This information sheet is for you to keep. We hope you will be willing to help us in this study.

Regards,

A/Prof. Clive Skilbeck, Prof. Rapson Gomez, Dr. Nenagh Kemp, Natasha Laird and Sinead Marriott.



Participant Consent Form

Paediatric Traumatic Brain Injury: Social Cognition and Emotional Functioning

1. I have read and understood the 'Information Sheet' for this study.
2. The study has been explained to me, and any possible effects it might have.
3. I understand the study involves me completing some tasks and questionnaires. They will take around 60-70 minutes.
4. I understand that all research data will be securely stored on the University of Tasmania premises for at least five years. I also understand that a computer file will continue to be held by the primary researcher in case I need my results in the future.
5. I have asked any questions I wanted to and am happy with the answers I have received.
6. I agree that the answers gathered from me on the tasks may be published but I will not be identified as a participant.
7. I understand that the researchers will make sure no one will know who filled out each questionnaire and that any information I supply to them will be used only for the purposes of the study.
8. I agree to participate in this study and understand that I may withdraw at any time without any effect.

I (your name) agree to the above.

..... (your signature)

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator:

Signature:

Appendix M

SPSS Raw Data: Study 2 and Study 3

See CD

Appendix N

SPSS Analyses Output: Study 2

See CD

- N1 Descriptive Statistics and Correlations for Study 2 and Study 3 Measures
- N2 Significance Testing Between Study 1 and Study 2 Correlations
- N3 Significance Testing Between Study 1 and Study 2 Means
- N4 Regression Analyses for the Compensatory Model: Study 2
 - Compensatory Model: Negative Affect and Emotional Attention
 - Compensatory Model: Negative Affect and Emotional Clarity
 - Compensatory Model: Negative Affect and Mood Repair
- N5 Regression Analyses for the Risk-Protective Model: Study 2
 - Risk-Protective Model: Negative Affect and Emotional Attention
 - Risk-Protective Model: Negative Affect and Emotional Clarity
 - Risk-Protective Model: Negative Affect and Mood Repair
- N6 Simple Slopes Computation for Negative Affect \times Mood Repair Interaction: Study 2
- N7 Regression Analyses for the Challenge Model: Study 2
- N8 Regression Equation Analyses for Negative Affect \times Negative Affect Interaction Effect: Study 2
- N9 Regression Analyses for the Protective-Protective Model: Study 2
 - Protective-Protective Model: 0 Protective Factors
 - Protective-Protective Model: 1 Protective Factor
 - Protective-Protective Model: 2 Protective Factors

Appendix O

SPSS Analyses Output: Study 3

See CD

- O1 Regression Analyses for the Compensatory Model: Study 3
 - Compensatory Model: Lability/Negativity and Emotion Regulation
- O2 Regression Analyses for the Risk-Protective Model: Study 3
 - Risk-Protective Model: Lability/Negativity and Emotion Regulation
- O3 Regression Analyses for the Challenge Model: Study 3
- O4 Regression Analyses for the Protective-Protective Model: Study 3
 - Protective-Protective Model: 0 Protective Factors
 - Protective-Protective Model: 1 Protective Factor